WILDLIFE REVIEW

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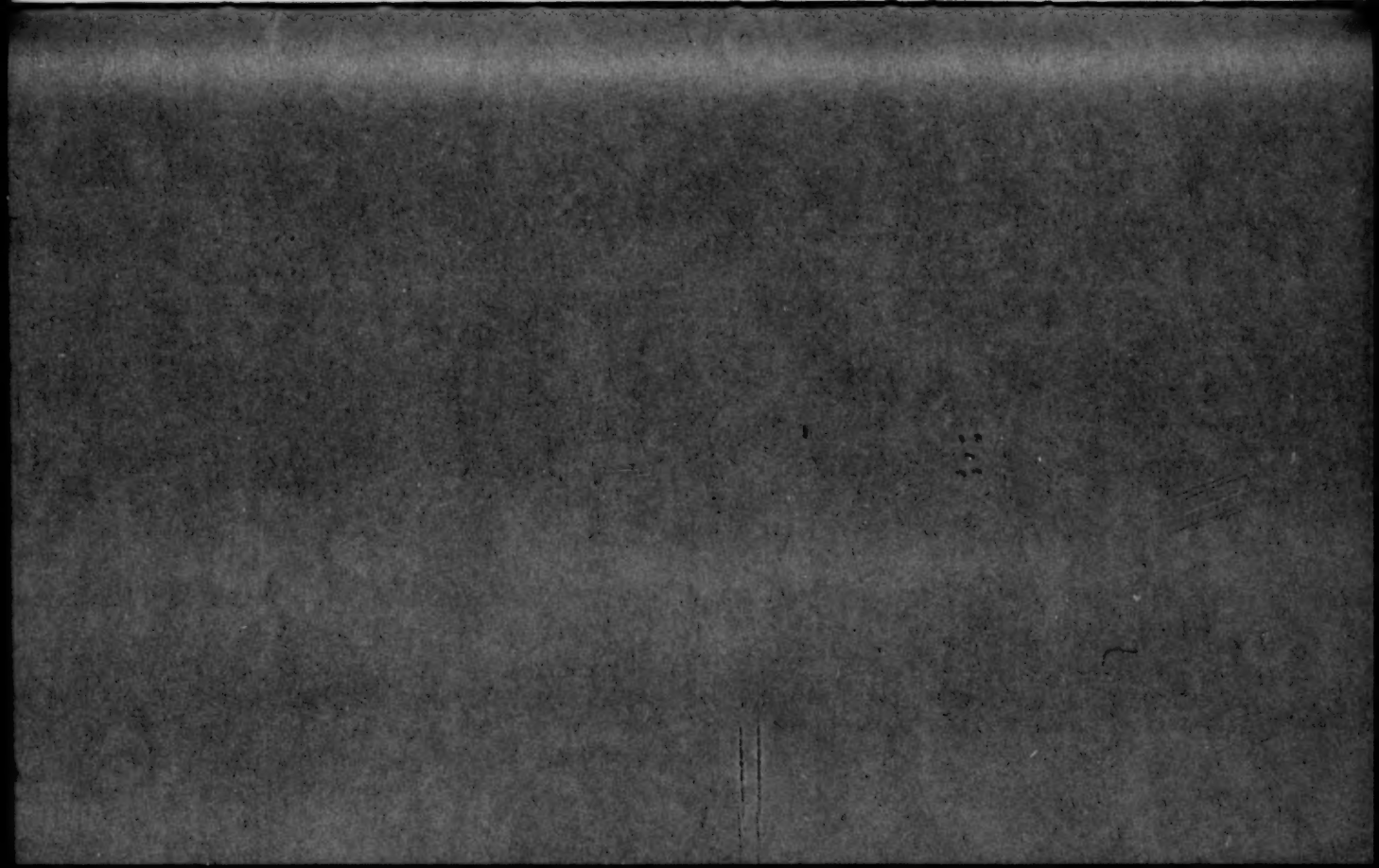

WILDLIFE REVIEW

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Except as indicated, abstracts are by William H. Stickel, editor.

Clawson, Marion. STATISTICS ON OUTDOOR RECREATION. Resources for the Future, Inc., 1145 19th St., Wash. 6, D. C. xi + 156 p., 28 figs., 58 tables. 1958. $2.00, paper.

The author and his cooperators have brought together a great body of figures on our recreational areas and trends in their acreage and use. Data are presented in numerous tables and graphs and discussed in the text. Major sections pertain to national parks, national forests, wildlife refuges, TVA system, reservoirs built by Army Engineers, sales of boats and motors, state parks, municipal and county parks, hunting and fishing. Data from different sources are not entirely satisfactory, but the author has considered them cautiously and from many angles. Readers can use the data for a wide variety of purposes, but the general purpose of the volume is to study trends of use in relation to area and opportunity. The general pattern is clear: acreage in parks, forests and refuges has grown but little for many years, but use of them has skyrocketed. For example, the annual av. increase in use since World War II is 8% for national parks, 10% for national forests, 12% for wildlife refuges, 15% for TVA reservoirs, 28% for Army engineers reservoirs, 10% for state parks, and 4% for municipal and county parks. Sales of boats and motors, and hunting and fishing licenses, have soared. Costs of land acquisition and maintenance have also soared, and expenditures for these purposes have not been able to keep pace. In the last 20 years, our population has increased at an av. of 1.75% a year. Per capita income, in terms of constant prices, has increased at about 1.9% a year. Travel has increased even more rapidly. Combined, these factors exert heavy pressure on recreational areas and facilities.

Committee. WILDLAND RESEARCH IN CALIFORNIA--THE KEY TO BETTER RESOURCE MANAGEMENT. Calif. Div. For., Sacramento, in cooperation with U. Calif. Sch. For. and US For. Serv. 33 p., illus. Feb. 1958.

This concise, well-illustrated pamphlet outlines present problems of forest and range management, sketches extent of present knowledge, and lists research needs. The goal is sound economic knowledge of how to handle each type of wild land in Calif. As practical information is gained, demonstration areas are to be set up for each land type. An infinite amount of research is needed, as indicated by lists given here. The publication mentions wildlife briefly in connection with range problems. One page deals with research on forest recreation. The bulk of the paper concerns forest management needs.

Hogner, Dorothy Childs. CONSERVATION IN AMERICA. J. B. Lippincott Co., E. Washington Square, Philadelphia, Pa. 240 p., illus. with thumbnail sketches. 1958. $3.75. [From review in Outdoor News Bul. 12(12).]

"Like most books of this type, CONSERVATION IN AMERICA contemplates the past, present, and future in the development of a natural resources conservation concept in this country. It traces destruction of forest, soil, and wildlife resources in the early exploitation of our nation, the laws and programs that were adopted in subsequent years as the errors became obvious, and the fruits that have been born of conservation programs now in action. Unlike many books on this general subject, CONSERVATION IN AMERICA provides a lucid, readable account that should be interesting and informative to readers ranging in years beyond the mid-teens. With only minor exceptions, CONSERVATION IN AMERICA is up-to-date in its discussion of conservation laws and programs operating from the national level. The author has included a helpful directory to private organizations and governmental agencies working on national and international aspects of conservation." A review by Frances J. Flick [J. For. 56(7)] points out that although the book was written with young readers in mind, and is well written and readable, it is factually more technical than many textbooks on conservation. Facts and terminology were checked with authorities. Mrs. Hogner writes mainly about things she knows first hand, yet the book has good geographic balance. The warmest writing in the book is about animals.

Smith, Arthur Dwight. THE STATUS OF FEDERAL LAND GRANT LANDS IN UTAH AND PROPOSALS FOR THEIR MANAGEMENT. Ph.D. thesis, U. Mich. 173 p. 1957. [From long abstract in Dissertation Abstracts 18(4).]

From 7.5 million acres in 1896, public lands in Utah have decreased 3 million acres, with another million acres available when the remainder of the state is surveyed. Significant deterioration of the range has attended years of grazing. Lands that remain are chiefly important for public values of water conservation

and recreation. Lack of state land policy and organization are considered largely responsible for deterioration of the land. A new land policy is proposed, based on adoption of a philosophy of use of lands in the public interest. To help implement such a policy, public lands are here zoned on the basis of recreation, hunting, and water production, and maps are given to show best uses of lands. A plan of organization of a Land and Forestry Commission is outlined. The Commission would have divisions of lands, forestry, minerals, and parks. "The latter one is new, no organization in Utah at present being charged with planning for the recreational needs of the state."--L. F. Stickel.

Swift, Ernest. THE GLORY TRAIL / THE GREAT AMERICAN MIGRATION AND ITS IMPACT ON NATURAL RESOURCES. Natl. Wildl. Fed., 232 Carroll St. NW, Wash. 12, D. C. v + 50 p. 1958. Price not stated.

Vividly written story of the exploration, subjugation, and exploitation of the U. S. It shows how waste, fire, and erosion accompanied settlement and why the great fights for conservation got under way and are continuing. 24 readable references are cited.

Yale Conservation Club. YALE CONSERVATION STUDIES. Yale Cons. Club, 77 Prospect St., New Haven, Conn. Vol. 6. ii + 66 p., 3 photos. 1957. $1.00.

A series of worthwhile essays on important conservation problems. Most are by graduate students of the Yale Conservation Program. They vary in length and factual content but all represent serious consideration and informed judgment. They are: Introduction [human population problems], by Wm. Vogt. Resource planning: A problem in communication, by Pierre Dansereau. Community natural areas, by K. W. Hunt. Land use in the Philippines, by J. B. Viado. Conservation education in the public schools, by J. F. Connolly. The utilization of Connecticut's old field hardwoods, by E. A. Kurmes. Notes on research methods in conservation, by R. L. Bury. Agriculture in a developing fringe area: Present trends and suggested actions in Connecticut, by Dorothy L. Moore. Alaskan recreation: Its potential, its development, by D. M. Bishop. Some aspects of strip mine reclamation, by Nan M. Harman. Utilization of aquatic vegetation, by B. C. Parker. A visit to the gorilla sanctuary in southwest Uganda, by Oliver Milton. Sulfur--An air pollutant and a resource, by Mary-Louise Kurmes. Trail to tomorrow [how to provide conservation material for teachers], by J. R. Schaefer. The agricultural possibilities of tropical soils, by Eric Ueland. Spring in the desert, by Aino Roosma.

SOILS

Arneman, H. F., and others. SOIL SURVEY OF NICOLLET COUNTY, MINNESOTA. US Soil Cons. Serv., Ser. 1948, no. 2. 27 p., 3 figs. + large single-fold maps bound in. Mar. 1958. Price not stated. Sold by Supt. Documents.

Is in new 9 x 11 in. format with all maps and other inserts bound in and having single folds. This adds much to the usability and permanence of the good maps. As indicated by series designation, data are based chiefly on work in 1948; users must make allowances for land-use changes.

Carlisle, F. J., and others. SOIL SURVEY OF FRANKLIN COUNTY, NEW YORK. US Soil Cons. Serv., Ser. 1952, no. 1. iii + 75 p., 2 figs. + large single-fold maps based on aerial photos and bound into volume. May 1958. Sold by Supt. Documents.

Cole, Ralph C., and others. SOIL SURVEY OF THE SANTA BARBARA AREA, CALIFORNIA. US Soil Cons. Serv., Ser. 1944, no. 8. 1-178 p., 8 pl. + large folding maps. Mar. 1958. Price not stated. Sold by Supt. Documents.

Elder, Joe A., and others. SOIL SURVEY OF MARION COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1950, no. 2. 88 p., 8 figs. + large single-fold maps bound in. Apr. 1958. Price not stated. Sold by Supt. Documents.

The many large maps of this volume are bound in and have only 1 fold each. These maps are based on aerial photographs; soil types, symbols, and cultural features are superimposed. Scale of maps is 1:20,000, or about 3-1/4 in. per mile. Soil surveys of this type, and their maps, should be useful for many types of wildlife work.

Folks, James J., and others. SOIL SURVEY OF BLUEWATER AREA, NEW MEXICO. US Soil Cons. Serv., Ser. 1955, no. 2. i + 20 p., 12 figs. + large single-fold maps based on aerial photos and bound into volume. May 1958. Sold by Supt. Documents.

Gallatin, M. H., and others. SOIL SURVEY (DETAILED-RECONNAISSANCE) OF DADE COUNTY, FLORIDA. US Soil Cons. Serv., Ser. 1947, no. 4. 1-56 p., 12 figs. + large folding maps. Apr. 1958. Sold by Supt. Documents.

Henry, E. F., and others. SOIL SURVEY OF PRINCE EDWARD COUNTY, VIRGINIA. US Soil Cons. Serv., Ser. 1949, no. 4. 1-57 p., 5 figs. + large single-fold maps, based on aerial photos, and bound in. June 1958. Sold by Supt. Documents.

Pearson, C. S., and others. SOIL SURVEY OF ONTARIO AND YATES COUNTIES, NEW YORK. US Soil Cons. Serv., Ser. 1949, no. 5. 1-126 p., 7 figs. + large single-fold maps based on aerial photos and bound in. June 1958. Sold by Supt. Documents.

Porter, H. C., and others. SOIL SURVEY OF FLUVANNA COUNTY, VIRGINIA. US Soil Cons. Serv., Ser. 1947, no. 5. 178 p., 4 figs., 5 pl. + 7 large folding maps. Mar. 1958. Sold by Supt. Documents.

Smith, L. H., and others. SOIL SURVEY OF YAKIMA COUNTY, WASHINGTON. US Soil Cons. Serv., Ser. 1942, no. 15. 143 p., 8 pl., 2 figs. + large folding maps. Apr. 1958. Price not stated. Sold by Supt. Documents.

Swenson, G. A., and others. SOIL SURVEY OF MADISON COUNTY, ALABAMA. US Soil Cons. Serv., Ser. 1947, no. 3. 1-101 p. + single-fold maps bound in. Feb. 1958. Sold by Supt. Documents.

Templin, E. H., and others. SOIL SURVEY OF McLENNAN COUNTY, TEXAS. US Soil Cons. Serv., Ser. 1942, no. 17. 1-124 p., 8 pl., 2 figs. + large folding maps. May 1958. Sold by Supt. Documents.

Wilde, S. A. (U. Wis.) FOREST SOILS, THEIR PROPERTIES AND RELATION TO SILVICULTURE. Ronald Press, N. Y. 537 p. 1958. $8.50. [From review by Monroe Bush, Am. For. 64(4).]

"If you ever saw a book that was not meant for the amateur, this is it; but it is hard to imagine a professional trying to get along without it. Forest Soils treats its subject from two directions: Part I, Soil as a Medium for Tree Growth; Part II, Soil Science and Silviculture. This is the most modern, comprehensive treatment available to the forester of a subject that is gaining in recognized importance each year. Dr. Wilde, professor of soils in the University of Wisconsin, has made a major contribution in authoring this work." A review by Stephen H. Spurr [J. For. 56(7)] confirms the authoritativeness and technicality of the book and points out that it provides "a good introduction to the Russian, German, and other European forest soils literatures, and with concrete examples of the work of men in these countries." Wilde's research on forest soils of the U. S. Lake States is well represented in his book.

Wildermuth, Robert, and others. SOIL SURVEY OF HENRY COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1948, no. 3. 1-198 p., 10 pl., 1 fig. + large folding maps. June 1958. Sold by Supt. Documents.

Wildermuth, Robert, and others. SOIL SURVEY OF HOUSTON COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1949, no. 2. 49 p., 11 figs. + large single-fold maps bound in. Mar. 1958.

In new large format, 9 x 11 in., with 2-column pages. Maps are based on aerial photographs, have but one fold each, and are bound in.

Wilson, LeMoyne, and others. SOIL SURVEY OF RICHFIELD AREA, UTAH. US Soil Cons. Serv., Ser. 1944, no. 9. 93 p., 1 pl., 1 fig. + large folding maps. Feb. 1958. Sold by Supt. Documents.

Covers portions of Sevier Valley and Round Valley in Sanpete, Sevier, and Millard counties.

CONSERVATION EDUCATION

Hibbs, Clyde William. AN ANALYSIS OF THE DEVELOPMENT AND USE OF OUTDOOR LABORATORIES IN TEACHING CONSERVATION IN PUBLIC SCHOOLS. Ph.D. thesis, U. Mich. 182 p. 1957. [From Dissertation Abstracts 18(4), where long abstract is given.]

Lively, Charles E., and Jack J. Preiss. CONSERVATION EDUCATION IN AMERICAN COLLEGES. Ronald Press, 15 E. 26th St., N. Y. 10, N. Y. 267 p., illus. 1957. $5.00. [From review by J. F. Lewis, J. For. 56(5).]

"...represents the findings of a...survey covering 1,116 colleges and universities of the United States... Its premise that good conservation practices, once established, are not self-perpetuating but depend upon the continued support of a well informed people places a great obligation upon education..." Public support is far from a reality. Most conservation teachers felt that people of their areas did not have a clear concept of conservation. The teachers believed that the core of conservation education should be concepts and principles; this indicates a significant departure. "At present, the aspects of conservation most likely to be taught are soils, minerals, water, forests, and wildlife in the order given. The aspects least likely to be offered are recreation, range management, and oceanography." Belief is growing that conservation concepts should become part of general education. "Before this ideal can be reached, the report indicates that a number of things must be done: (1) there must be a clarification and more precise definition of the concept of conservation, (2) a positive approach must take precedence over a negative one, (3) an action program must be set up that will stimulate participant interest, (4) an integrated conservation education program must be developed at every level whether in the classroom or through the efforts of professional conservationists in interpreting their problems to the users of their products, and (5) that educational administrators must be made aware of their responsibilities in implementing an integrated program."

BIBLIOGRAPHIES, DIRECTORIES, BIOGRAPHY, HISTORY

Emerson, Margaret W. CUMULATIVE INDEX TO THE TRANSACTIONS OF THE NORTH AMERICAN WILDLIFE CONFERENCE VOLUMES 1-22, 1936-1957. Wildl. Mgt. Inst., 709 Wire Bldg., Wash. 5, D. C. 123 p. [1958.] $2.00, paper.
Valuable index to both subjects and authors.

Galbraith, John S. THE HUDSON'S BAY COMPANY AS AN IMPERIAL FACTOR, 1821-1869. U. Calif. Press, Berkeley. 500 p. 1957. $6.75. [From Monthly Checklist of State Publ. 49(2).]

Van Oosten, John. GREAT LAKES FAUNA, FLORA AND THEIR ENVIRONMENT / A BIBLIOGRAPHY. Great Lakes Commission, Ann Arbor, Mich. x + 86 p. 1957.
This bibliography is designed to further hydrobiological studies of the Great Lakes. Titles are grouped under 7 major headings: Fish, Vertebrates other than fishes, Invertebrates, Plants, Limnology, and Geology. Author states that the list of titles on fish and limnology is as complete as possible, and that other subjects are less completely covered. The list of titles on vertebrates other than fishes, for example, includes only 89 papers and could have been expanded greatly.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Greig-Smith, P. QUANTITATIVE PLANT ECOLOGY. Academic Press, 125 E. 23d St., N. Y. 10, N. Y. 198 p., illus. 1957. $6.00. [From review by Murray F. Buell, A.I.B.S. Bul. 8(2).]

"'At the present stage of development of plant ecology, when the great value of a quantitative approach is being apparent, there is a tendency either to apply quantitative methods too enthusiastically, or to apply them to problems to which they are not, or not yet, appropriate.' This, to quote from the book, expresses one of the principal underlying values of the book. Throughout, the book is a presentation of statistical procedures that can be applied to vegetation studies and an assessment of relative values of both the procedures and the quantities they measure. The author makes it clear that while in many

instances statistics have value related to vegetation, in others their interest may lie solely in the statistics themselves. The book has considerable value for a student with some background in statistics. It can give him an excellent idea of how his statistical background can be applied to vegetational study. For the person with little or no background in statistics the book also makes a nice contribution. In the first place, one finds throughout the book discussions that enhance one's appreciation of the values of the quantitative methods in their application to plant ecology. In the second place, the discussion of concepts such as climax, succession, reality of communities, etc. from the strict point of view of the statistical ecologist is especially instructive."

A review in J. For. 56(6) states: "It is a book for research workers, advanced students, and other specialists. This book describes the quantitative methods used in ecology and the application of statistical methods to ecological problems. The seven chapters cover quantitative methods of describing vegetation, sampling problems, random versus non-random distribution of vegetation, association among species, correlation with habitat factors, and delineation of plant communities."

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Adams, Charles F. CHECKLIST OF PLANTS OF JOSHUA TREE NATIONAL MONUMENT. SW. Monuments Assn., Globe, Ariz. ii + 44 p. 1957. 50¢.

This checklist includes lichens, ferns, and seed plants. Common and scientific names of each species are given and local distribution or occurrence is stated. Months of flowering are indicated for most species.

Beatley, Janice Carson. THE PRIMARY FORESTS OF VINTON AND JACKSON COUNTIES, OHIO. Ph.D. thesis, Ohio State U. 297 p. 1953. [From long abstract in Dissertation Abstracts 18(5).]

Original forest types prior to Eur. settlement are described from analysis of field notes of surveyors in 1798-1805. Interpretation was assisted by studies of physiography and present vegetation. Three general forest areas were recognized. For each the condition and composition of the following types is described: upland oak, mesic communities of residual soils, white oak communities of lacustrine terraces, and swamp forest communities.--L. F. Stickel.

Dushman, Donald Otto. THE ECOLOGICAL SIGNIFICANCE OF OHIO'S CLIMATES. Ph.D. thesis, Ohio State U. 125 p. 1953. [From long abstract in Dissertation Abstracts 18(5).]

Climates of Ohio, historical and present, are analysed in relation to vegetative cover, with particular attention to prairie areas. Forests of Ohio are transitional between more mesic types of the East and drier types of the Southwest. Tall-grass prairies of Iowa and Ill. and smaller areas in Ind. and Ohio are regarded as transitional between short-grass steppe vegetation of the West and forest vegetation of the East. Climatic history is believed to be sufficient to explain the occurrence of prairie areas in Ohio, which now must be considered relic communities, for present climate is better suited to forest vegetation.--L. F. Stickel.

Buttery, R. F., and L. R. Green. CHECKLIST OF PLANTS OF THE SAN JOAQUIN EXPERIMENTAL RANGE. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), Misc. Pap. no. 23. iii + 32 p., cover photo. Apr. 1958.

The San Joaquin Range is a 4600-acre area in the foothills of the Sierra Nevada, Madera Co., Calif. It is in the annual grass type and has a sparse covering of trees and occasional stands of brush. This useful publication lists all seed plants by families. Scientific and common names of each species are stated, relative abundance is indicated, and habitat is outlined.

Crandall, Dorothy Louise. GROUND VEGETATION PATTERNS OF THE SPRUCE-FIR AREA OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK. Ph.D. thesis, U. Tenn. 127 p. 1957. [From long abstract in Dissertation Abstracts 18(4).]

"Based upon frequency and coverage of species of shrubs and herbaceous plants ...eight site types [are] proposed for the southern boreal forest." Three site types are suggested for the spruce-hardwoods forest and 3 for the beech-birch

gap forests. Development of spruce and fir stands following fire is extremely slow, and also is slow on rocky slopes because of soil washing. Windthrow damage is characteristic of higher elevation fir forest and results in even-aged stands. At lower altitudes, individual trees may be uprooted or broken off, so that replacement of forest is gradual and not by an even-aged stand. There are fewer herbaceous species at higher elevations, but their coverage is greater.--L. F. Stickel.

Dawson, E. Yale. HOW TO KNOW THE SEAWEEDS. Wm. C. Brown Co., Dubuque, Iowa. 197 p., illus. 1957? $2.75. [From review by Harold C. Bold, A.I.B.S. Bul. 8(3).]

Useful field manual for amateur or beginning student of marine algae. It covers Atlantic, Gulf, and Pacific coasts of U. S. Omitted are very small, rare, or local algae. Numerous illustrations by author supplement the dichotomous key. The book includes "brief introductory chapters on marine vegetation, methods of collection and preservation, reproduction, references to more extensive works dealing with marine algae and instructions regarding the use of the picture-key. A brief treatment of marine flowering plants follows the key to the algae. A combination index and 'pictured-glossary' (for some of the terms) conclude the volume. There is no doubt that this contribution will fulfill the purposes for which it is designed... In the light of his expressed intentions, the author has succeeded in producing a book which will be extremely useful to many."

Enari, Leonid. PLANTS OF THE PACIFIC NORTHWEST. Binfords & Mort, Portland, Ore. 315 p., 185 figs. 1956. $3.00. [From review by Robert Ornduff, Madroño 14(6).]

Intended for people for whom standard manuals are too technical. It includes an easily-used key to 663 native and introduced plants of the region. The key is based on floral and vegetative features that can be seen without magnification. Use of technical terms is held to a minimum. Glossary and illustrations of plant parts are inserted next to the key. Most illustrations are simple line drawings, as of leaves. Brief description and habitat statement are given for each species treated. The book is indexed, attractively bound, popularly priced, and small enough to be carried conveniently in the field. "This book will appeal to the amateur interested in identifying the conspicuous plants of the Pacific Northwest; its greatest recommendation is its simple and easily used key. Once the fundamentals of using this key are in hand, it will be a relatively painless transition to the more technical floras and manuals..."

Goder, Harold A. (U. Wis., Madison.) PRE-SETTLEMENT VEGETATION OF RACINE COUNTY. Trans. Wis. Acad. Sci., Arts and Lett. 45: 169-176, illus. 1957. [From Biol. Abs. 32(4).]

The land survey of Racine Co. was completed in 1836. Utilizing the information recorded by the surveyors, the writer separated the pre-settlement vegetation into several plant communities. Oak opening and prairie communities predominated. Other types were upland forest, swamp and marsh. Topography, drainage systems and fire influenced the pattern of vegetation.--Auth. summ.

Grayson, John Francis. THE POSTGLACIAL HISTORY OF VEGETATION AND CLIMATE IN THE LABRADOR-QUEBEC REGION AS DETERMINED BY PALYNOLOGY. Ph.D. thesis, U. Mich. 278 p. 1957. [From long abstract in Dissertation Abstracts 18(4).]

Pollen-profile and vegetation studies in bogs led to these conclusions: The first period in this region was dominated by tundra vegetation. This was followed by a Betula-Alnus association. This was succeeded by the boreal woodland, which has dominated for the past 4-5 thousand years. The only climatic change has been a gradual warming from the time of deglaciation. Much of the region was deglaciated about 8000 years ago, practically all by 6000 years ago. A warm period about 3500 years ago may not have been warmer than present.--L. F. Stickel.

Lawrence, Donald B. (U. Minn.) GLACIERS AND VEGETATION IN SOUTHEASTERN ALASKA. Am. Sci. 46(2): 88-122, 15 figs. June 1958.
Important paper on glacial history, possible causes of glaciation, vital role of alder thickets in providing nitrogen to glacial soils, successional changes of vegetation after glaciation, and causation of pit ponds in the muskeg.

Russell, Norman H. (Grinnell Coll., Grinnell, Iowa.) THE VASCULAR FLORA OF THE EDMUND NILES HUYCK PRESERVE, NEW YORK. Am. Midl. Nat. 59(1): 138-145. Jan. 1958.
This private preserve is a diversified area of 470 acres located 22 mi. sw. of Albany. The paper gives a short description of the preserve and a non-annotated list of plants.

Scheffer, T. H., and Xerpha M. Gaines. (State Coll. Wash., Pullman.) BOTANICAL SURVEY OF THE GRAND COULEE. Res. Stud. State Coll. Wash. 25(3): 207-235, maps. 1957. [From abstract in Biol. Abs. 32(3).]
"With flooding of thousands of acres of land by equalizing reservoirs formed in irrigation development from Grand Coulee dam, in the future the flora of the region should undergo many changes. The authors, therefore, attempted to survey the plant life of the area before flooding took place." Their paper describes the area and its plant cover, and supplies an annotated catalog of the plants.

Shaw, Richard J. (Utah State U., Logan.) VASCULAR PLANTS OF GRAND TETON NATIONAL PARK. Am. Midl. Nat. 59(1): 146-166. Jan. 1958.
Gives brief description of the park and its major communities and lists plants with notes on abundance and habitats.

Stern, Wm. L., and George K. Brizicky. (Yale U., New Haven, Conn.) THE WOODS AND FLORA OF THE FLORIDA KEYS. INTRODUCTION. Trop. Woods 107: 36-65. 1957. [From Biol. Abs. 32(4).]
This initial report, sets forth briefly, the geography, geology and soils of the Keys. A section on the origin and distribution of the flora describes the means whereby plants from more southerly regions came to populate these islands. The different types of vegetation are discussed under the headings: "Hammock forests," "Pine forests or pinelands," "Mangrove swamp forests," "Strand vegetation," and "Salt water marshes." The effects of fire on the vegetation are reported. If fire were excluded, pinelands would revert to forests of tropical hardwoods. The history of botanical exploration is detailed. One section indicates the future dissipation of the vegetation and flora if present man-induced destruction on the Keys persists.--W. L. Stern.

Symonds, George W. D. THE TREE IDENTIFICATION BOOK. M. Barrows & Co., 425 4th Ave., N. Y. 16, N. Y. 240 p., illus. with more than 1,500 photos. 1958. $10.00. [From Outdoor News Bul. 12(11).]
Pictorial guide to principal trees of region from N. Dak. and Texas to East Coast except peninsular Fla. It does not include: 1) strictly southern or subtropical trees, 2) trees that barely enter the region, 3) some species of large genera, and 4) hybrids, varieties, and foreign trees. It does include certain naturalized foreign trees. The book has 2 parts: 1) Pictorial Keys for identification of genus, and 2) Master Pages for identification of species. In first section, such features as leaves, flowers, and fruit are grouped in separate keys. All features are arranged for easy reference. For example, similar leaves are shown next to one another for comparison. After determining genus, the reader turns to the cross-referenced Master Pages to determine species. The photos are excellent. All photographic details are of actual size, or comparable details are shown in the same scales.

Wistendahl, Warren A. (Ohio U., Athens.) THE FLOOD PLAIN OF THE RARITAN RIVER, NEW JERSEY. Ecol. Monog. 28(2): 129-153, 19 figs. Apr. 1958.
Study of floodplain soils and topography and detailed account of vegetation and its succession from sandbar, marsh, or abandoned field to mature forest.

PLANTS--FOREST SURVEYS

Bryan, Mackay B. FOREST STATISTICS FOR THE MOUNTAIN REGION OF VIRGINIA, 1957. US For. Serv., SE. For. Exp. Sta. (Asheville, N. C.), For. Surv. Rel. no. 52. ii + 52 p., 5 figs. Apr. 1958.

Detailed statistical account, with discussion of land-use and forest changes since 1940.

Ferguson, Roland H., and John R. McGuire. THE TIMBER RESOURCES OF RHODE ISLAND. US For. Serv., NE. For. Exp. Sta. (Upper Darby, Pa.). 38 p., illus. 1957.

With 750 people per sq. mi., R. I. is the most densely populated state of the U. S. Yet it is one of the most extensively forested states: 2/3 of its area is forest land. The timber is little used and is growing more than 6 times as fast as used. On the other hand, the stands are badly depleted: they consist mainly of small hardwoods; sawtimber stands are rare. Potentially, however, the forest is of high economic significance. Much of the forest might well be managed not only for timber but for water and recreation as well; the latter are important in a thickly settled state of expanding urbanization. This report provides information on these subjects and on timber volumes, cut, types, utilization, forest condition, ownership of forest land, etc.

Griswold, Norman B., and Roland H. Ferguson. THE TIMBER RESOURCES OF CONNECTICUT. US For. Serv., NE. For. Exp. Sta. (Upper Darby, Pa.). 36 p., illus. 1957.

Sixty-three per cent of Connecticut's land is in forest--more than twice the amount 100 years ago. Annual growth is more than 7 times cut. There are few trees of high quality, however, and timber output is relatively low. Multiple use of forest land is feasible and desirable. Most of the timber is hardwood, primarily oaks. "Connecticut's timber resource presents a challenge to her citizens. Income from this source could be doubled in a few years and increased many fold within two or three decades. Recreation, water, and other forest benefits would occur simultaneously." Data on timber volume, cut, condition, ownership, etc. are presented.

U. S. Forest Service. TIMBER RESOURCES FOR AMERICA'S FUTURE. US For. Serv., For. Resource Rep. no. 14. ix + 713 p., 139 figs. Jan. 1958. $7.00, cloth, from Supt. Documents.

This encyclopedic appraisal of our timber situation is the Forest Service's sixth "State-of-the-Union" report on timber. It consists of 13 sections: (1) summary, (2) forest land and timber, (3) growth and utilization, (4) forest protection, (5) productivity of recently cut lands, (6) forest tree planting, (7) ownership of land and timber, (8) timber resources of N. A. and the world, (9) future demand for timber, (10) timber supply outlook, (11) basic statistics, (12) definitions, converting factors, adequacy of data, (13) criteria for rating productivity. Sections 1 and 11 are available as separates from the U. S. For. Serv. The appraisal concerns itself strictly with timber supplies and needs, not with multiple-use values of forest stands. The outlook is for adequate timber supplies providing there is prompt and very substantial expansion and intensification of good forest-management practices. Among the highlights: Three-fourths of the forest land is in the East, but 2/3 of sawtimber volume is in the West. Total timber volumes are about the same as in 1945. Heavy reliance is placed on a small group of species. Timber quality is declining. Timber growth is increasing. Most eastern species now have favorable growth-cut ratios. One-fourth of timber cut is not utilized. Destructive agents, principally insects and disease, take exceedingly heavy toll. Fifty-two million acres need planting. Forest productiyity is poorest on small farm and other private ownerships, especially in the South. Forest productivity is best on public and forest industry ownerships. Inadequate stocking is the most significant factor in reducing productivity of recently cut land. The key to adequate timber supplies in the future lies with the 4.5 million farm and other private holdings.--L. F. Stickel.

WILDLIFE--NEW GAME SERIES

KOEDOE / JOURNAL FOR SCIENTIFIC RESEARCH IN THE NATIONAL PARKS OF THE UNION OF SOUTH AFRICA. No. 1. 200 p., illus. 1958. Published annually by Natl. Parks Bd. of Trustees, P. O. Box 787, Pretoria, S. Africa. No price stated. Available on exchange.

A well-printed volume, planned to appear annually, devoted to results of scientific studies in the national parks of the Union of South Africa. Approximately half the papers are in English, the others in Afrikaans with English summaries. Articles of the first issue deal with: geography and early history of Kruger Park; present and extirpated mammals of the Uitenhage and Cradock districts; effects of fire in Kruger Park and plans for prescribed burning; vegetation map of Kruger Park; 3 new species of moths from the Kalahari; short account of reptiles of Kalahari Gemsbok Park; ancient and recent observations on habits of hyaenas; aspects of animal ecology in the Kalahari; vegetative types, range condition, and reasons for movement of game in Kalahari Gemsbok Park; birds of Kalahari Gemsbok Park; geology, vegetation, and water relationships of game in Kalahari Gemsbok Park; small mammals of Kalahari Gemsbok Park; culicine mosquitoes of Kruger Park. These papers are substantial, documented, and highly informative.

LAND FOREST WILDLIFE. Published 6 times a year by Dept. Lands & Forests, Natural Resources Bldg., Edmonton, Alberta, Canada. Vol. 1, no. 1, 28 p., illus., Apr.-May, 1958.

A well-printed magazine of 9 x 6 in. designed to inform the public about the management of Alberta's renewable resources. Articles in the first issue report the results of a questionnaire survey of the 1957 pronghorn season, tell about the Rocky Mountain Forest Reserve system, give data on provincial parks, present regulations on rearing pheasants, tell briefly how to rear pheasants in captivity, provide a preview of fishing in 1958, discuss forest surveys, discuss work of the Lands Division, and give short popular accounts of crow and mule deer.

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Benton, Allen H., and Wm. E. Werner, Jr. (N. Y. State Coll. Teach., Albany; and Blackburn Coll., Carlinville, Ill.) PRINCIPLES OF FIELD BIOLOGY AND ECOLOGY. McGraw-Hill Book Co., 330 W. 42nd St., N. Y. 36, N. Y. vii + 341 p., illus. 1958. $6.50.

An excellent introduction to modern natural history. It is primarily a text for college students who have studied only a little biology and may or may not specialize in the subject. Serious amateurs should find it valuable. Professionals may consider it elementary. The book was kept simple by avoiding much of the technicality and jargon of any one field, but it provides basic background and perspective in many fields. It is written as interestingly as could be hoped, considering the multitude of facts and ideas. Students who study this book should get a good grasp of elementary ecology and of the purposes and basic methods of ecology and natural history. Chapters include: A brief history of field biology in America, Taxonomic principles, Ecological principles, Terrestrial plant succession, Aquatic plant succession, Economic field biology, Principles of population study, Principles of behavior study, Principles of the use of biological literature, and The choice and conduct of a field problem. An appendix cites many helpful references and suggests useful equipment. There are many good photographs and other figures, glossary, and index. Conservation topics are taken up in several chapters. Actually, the whole book pertains to conservation directly and indirectly, and exemplifies one worthwhile line of introduction to conservation. The book has many fine features. It has, for example, a serviceable introduction to ethology; and the authors' advice on choosing a problem to fit the investigator is the best we have seen. A companion volume, "Workbook for field biology and ecology," was reviewed in WR 91: 3.

Buchsbaum, Ralph, and Mildred Buchsbaum. BASIC ECOLOGY. Boxwood Press, Pittsburgh, Pa. 192 p., 161 photos, 20 drawings & diagrams. 1957. $2.35, paper; $3.50, cloth. [From review by Sarah F. Robbins, Bul. Mass. Aud. Soc. 42 (6).]

"The clear and nontechnical text is designed for the first-year college student and is supplemented by the really excellent line drawings and well-chosen photographs. The bibliography is comprehensive. This book will bring

fresh ideas to teachers and students. It is well worth the attention of everyone interested in the natural sciences. The...diagrams alone, which graphically illustrate such things as the pond-to-prairie succession, and the seasonal diet of the fox, make this a book to own." The authors "have clearly and concisely described exactly what makes up the study of ecology; the physical and living communities, the community and its periodic changes, ecological succession, distribution of plants and animals, and the biomes of the world. The ecological viewpoint is discussed in relation to matters very close to all of us: such as soil conservation, crop parasites, and hunting and fishing."

Darlington, Philip J., Jr. (MCZ, Harvard U.) ZOOGEOGRAPHY: THE GEOGRAPHICAL DISTRIBUTION OF ANIMALS. John Wiley & Sons, 440 4th Ave., N. Y. 16, N. Y. xii + 675 p., 80 figs. 1957. $15.00.

This magnificant volume, the result of 20 years' work, may long stand as a classic of its kind. Yet it is written throughout with painstaking simplicity. Jargon has been rooted out deliberately. Everything has been reduced to plain English and straightforward sentences, usually short ones. Scientific names offer the only barrier to general readers, and this was unavoidable. But the book is not a popularized work: it is a detailed, scholarly analysis of facts and principles. Darlington starts with close analysis of facts, considers the literature, and makes his own interpretations. His basic material is the present and past distribution of land and fresh-water vertebrates. His chapters on fresh-water fishes, amphibians, reptiles, birds, and mammals contain masses of thoroughly considered data. Later chapters are: Continental patterns and faunal regions. Island patterns. Evolution of the geographical patterns; area, climate, and evolution. The past in the light of zoogeography. Principles of zoogeography; geographical history of man. Each chapter is summarized at length and has its own list of key references. Some sections are too detailed for the general reader, but many sections and several whole chapters are fascinating as well as informative, hard to quit reading. Darlington's chief goal was to sift out the major facts and principles of world distribution. The field is too controversial for general agreement to be expected, but Darlington's conclusions should have wide influence--partly because fact, deduction, and speculation are clearly distinguished. We can mention few findings. Darlington sees no need for continental drift (at least since the Paleozoic) or hypothetical land bridges. Much over-water distribution is clearly indicated. Extinction of species and recession of ranges are as important in interpretation as derivation and expansion of new forms. Complexity of distributional patterns is stressed throughout, but the major pattern is one of dominant forms arising repeatedly in the Old World tropics and spreading throughout the world.

Macfadyen, A. ANIMAL ECOLOGY: AIMS AND METHODS. Sir Isaac Pitman & Sons, Ltd., London. xx + 264 p., 18 figs., 6 pl. 1957. 40s. (=$5.65). [From long review by N. G. Hairston, Ecology 39(2).]

This work is neither text nor encyclopedia, but a digestible animal ecology for adult naturalists, students, and laymen. Part I, The Ecology of Individuals (62 p.), takes up autecology, its values and shortcomings. The longest chapter treats microclimates and ways to measure them. Part II, Animal Population Ecology (78 p.), begins with methods of estimating populations. Accuracy and error of these methods are well treated. "There follows a consideration of demography, in which the parameters of populations are described, and indications given of the methods used to estimate them. The reader is next led carefully through the food-chain--biomass--productivity--efficiency concepts, with emphasis on the meanings that have been given to the various terms by different authors. The chapter ends with an argument favoring metabolic activity over biomass as a measure of production. ...the chapter on the metabolism of populations is thoroughly stimulating." Part III, Properties of Animal Communities (104 p.), begins with 4 chapters on population dynamics. These "treat mathematical, experimental, and field investigations both at the intra- and interspecific levels... The reader becomes aware of numerous controversies, from density dependence to population cycles, without being made to feel that he must take sides or that the controversies are likely to be settled shortly." The chapter on biocoenology takes up methods to detect and delimit communities, and discusses the co-extension of plant and animal communities. "There is a plea, accompanied by typical 'horror stories,' for ecological understanding before

control of natural populations is attempted, and the book closes with a summary of the author's ideas about promising methods and the most fertile fields of investigation." Macfadyen has taken numerous examples from his own field of soil zoology. Throughout, he presents both sides of controversies and labels his own opinions clearly. The book has a long bibliography that includes many European titles.

Sturges, Franklin Wright. HABITAT DISTRIBUTIONS OF BIRDS AND MAMMALS IN LOSTINE CANYON, WALLOWA MOUNTAINS, NORTHEAST OREGON. Ph.D. thesis, Ore. State Coll. 136 p. 1957. [From long abstract in Dissertation Abstracts 18(2).]

History and ecology of area are described. Ecological preferences and relative abundance of the commoner birds and mammals are discussed. Various systems of habitat classification (life zones, biomes, etc.) are considered in relation to results of this study.

Tinbergen, N. (U. Mus., Oxford, Eng.) DEFENSE BY COLOR. Sci. Am. 197(4): 48-54, 7 figs. Oct. 1957.

Interesting popular article. Experiments prove that protective and warning colorations really do protect their possessors. They also show that birds are able to perceive small differences in degree of adaptation; this can account for evolution and increasing perfection of adaptations in coloration.

WILDLIFE--NATURAL AREAS & REFUGES

Chapman, H. H. (205 Prospect St., New Haven, Conn.) SCIENTIFIC FORESTRY IN NATIONAL PARKS AND WILDERNESS AREAS? Am. For. 64(2): 18-19, 39-42, 1 photo. Feb. 1958.

Some people believe natural areas should be left natural at all costs. Some believe in enough interference to maintain desired vegetative stages. Others believe in managing the timber stands for conservative harvest, except in zones reserved for recreation use, where only sanitation cutting would be done. This paper is a good exposition of the last point of view, and gives examples of what the author considers good and bad practice. Chapman concludes that "trees should be cut within parks, when in the judgment of professionally trained men, their removal is necessary for the protection and health of the people's heritage." [In the reviewer's opinion, much of this hot controversy could be avoided by recognizing that different areas have entirely different purposes. Sanitation cutting in a designated "natural area" seems as absurd as the lack of it in a recreational area. Management is necessary if non-climax stands are to be preserved, but is highly undesirable in climax stands designated for preservation in natural condition.]

Ray, Carleton. THE EXUMA CAYS PARK PROJECT. Animal Kingdom 61(2): 34-39, 10 photos. Apr. 1958.

Destruction of plant and animal life of islands is familiar to all naturalists. Less familiar, but now becoming worrisome to those who are informed on the subject, is the depletion of the coral-reef fauna. "A policy of marine conservation must soon be formulated, and it should not be much different from the regulations that apply to land animals: protected species, protected areas, size and bag limits, licensing of fishermen." The proposed Exuma Cays Natl. Park in the Bahama Islands would protect both terrestrial and marine life, which are still relatively undisturbed but are in danger from developments. This paper gives a general discussion of the fauna and flora of the islands and tells what is being done to get the park established. "If the Exuma Cays National Park comes into being, the Bahamas will be the first to set up a true land-and-sea park to break down the false barrier of the shoreline as the border between two worlds... No longer will we have one set of rules for the land and another for the immense but not inexhaustible sea."

Stagner, Howard R. (Natl. Park Serv.) THE NATIONAL PARK WILDERNESS. US Natl. Park Serv. 37 p., 18 photos. No date. Rec'd. Jan. 1958.

Handsomely illustrated pamphlet that sets forth and explains the Service's thinking on the place of wilderness in national parks. The characteristic of wildness and naturalness is considered a vital feature. It must be preserved and protected not only from overuse by man but from fire, serious insect damage,

and certain other natural forces. Major scenic areas should be accessible, but this does not mean much extension of road system in older parks. Instead, intrusion of developments in certain scenes is to be reduced by relocation, and inappropriate developments are to be guarded against. One interesting point is the Service's view that "a wilderness experience" can be gained by a view from a road. [This is entirely true for the average tourist. But the attitude could lead to multiplication of roads as pressures on parks grow and administrations change. The perpetual pressure to provide for greater use surely is the most crucial problem in keeping wilderness wild throughout the centuries.]

Symposium. PRESERVING NATURAL CONDITIONS IN A WORLD OF TECHNOLOGICAL DOMINANCE. Nature Conservancy (4200 22d St. NE., Wash. 18, D. C.), Ann. Rep. 1957. p. 5-15. 1958.

The distinguished contributors to this symposium tell why preservation of natural areas is so urgent, where the needs are greatest, and what policies and lines of action should be followed. Papers are: The Ultimate Limit of Our Resources, by James Bonner. The Preservation of Large Scale Areas, by Donald S. Farner. Conservation of Small Endemic Floras, by Herbert L. Mason. Visitor Impact upon Natural Areas, by Russell K. Grater. Our Social Responsibilities, by Walter P. Cottam.

U. S. Fish & Wildlife Service. REFUGE LEAFLETS.

Four series of these leaflets are being issued for use of visitors to refuges. General Series begins with RL-1, Bird List Series with RL-101, Mammal Series with RL-301, and Historical Series with RL-401 (renumbered from RL-201). The present listing is intended to bring up to date, through June 1958, the list of earlier numbers presented in WR 78, p. 11-12, and WR 85, p. 8. No addition to the Historical Series has appeared.

General Series.--Each provides general information about a refuge and has a simple map and sketches.

RL 13.	Squaw Creek	Mo.	1957	4p.
14.	Kenai National Moose Range	Alaska	1956	2p.
15.	Tamarac	Minn.	1957	4p.
16.	Imperial	Ariz.-Calif.	1956	2p.
17.	Bosque del Apache	N. M.	1957	"
18.	Hagerman	Texas	"	"
19.	Muleshoe	Texas	"	"
20.	National Elk	Wyo.	"	"
21.	Kofa	Ariz.	"	"
22.	Sullys Hill	N. Dak.	"	"
23.	St. Marks	Fla.	"	4p.
24.	Merced	Calif.	"	2p.
25.	Aransas	Texas	1958	"
26.	Desert Game	Nev.	"	4p.
27.	Mud Lake	Minn.	In prep.	"
28.	Laguna Atascosa	Texas	1958	2p.
29.	Sacramento	Calif.	"	3p.
30.	Tishomingo	Okla.	"	2p.
31.	Bitter Lake	N. M.	"	"
32.	Sand Lake	S. Dak.	[1958]	4p.
33.	Savannah	S. C.-Ga.	"	"
34.	Elizabeth Morton	N. Y.	1958	"
35.	Monomoy	Mass.	"	"
36.	Great Meadows	Mass.	"	"
37.	Moosehorn	Me.	"	"
38.	Montezuma	N. Y.	"	"
39.	Parker River	Mass.	"	"
40.	Brigantine	N. J.	"	"
41.	Bombay Hook	Del.	"	"
42.	Missisquoi	Vt.	"	"
43.	Killcohook	N. J.	"	"
44.	Havasu Lake	Ariz.-Calif.	"	"
45.	Upper Souris	N. Dak.	"	"

Bird List Series.--Each has a little information about the refuge and contains a list of its birds, with indications of seasonal occurrence and relative abundance. Each consists of 3-4 processed pages.

RL 161.	Lacassine	La.	1956
162.	Back Bay	Va.	"
163.	Deer Flat	Idaho	"
164.	Camas	Idaho	"
165.	Brigantine	N. J.	"
166.	Delta	La.	"
167.	National Bison Range	Mont.	"
168.	Monomoy	Mass.	"
169.	Missisquoi	Vt.	"
170.	Noxubee	Miss.	"
171.	Muleshoe	Texas	"
172.	Parker River	Mass.	"
173.	Turnbull	Wash.	"
174.	Great Meadows	Mass.	"
175.	Loxahatchee	Fla.	"
176.	National Elk	Wyo.	"
177.	Sanibel	Fla.	1957
178.	Monte Vista	Colo.	"
179.	Mingo	Mo.	"
180.	Lacreek	S. Dak.	"
181.	Okefenokee	Ga.	"
182.	Nine-Pipe and Pablo	Mont.	"
183.	Killcohook	N. J.	"
184.	Hart Mountain	Ore.	"
185.	Chassahowitzka	Fla.	"
186.	Salton Sea	Calif.	"
187.	Kirwin	Kans.	"
188.	Carolina Sandhills	S. C.	1958
189.	Swan Lake	Mo.	1957
190.	Red Rock Lakes	Mont.	"
191.	Burford Lake	N. M.	"
192.	Hutton Lake	Wyo.	1958
194.	Slade	N. Dak.	"

Bird List Series, Revised issues.

RL 101-R.	Cape Romain	S. C.	[1955]
104-R.	Klamath Basin	Ore.-Calif.	1957
105-R.	Sand Lake	S. Dak.	1958
106-R.	Bowdoin	Mont.	1957
107-R.	Mattamuskeet and Swanquarter	N. C.	"
108-R.	Kentucky Woodlands	Ky.	1956
109-R.	Wichita Mountains	Okla.	1957
110-R.	Crab Orchard	Ill.	"
111-R.	Mud Lake	Minn.	[1956]
112-R.	Havasu Lake	Ariz.-Calif.	1957
114-R.	Sheldon	Nev.	1958
115-R.	Arrowwood	N. Dak.	1957
118-R.	Seney	Mich.	"
120-R.	Santee	S. C.	1958
121-R.	Hagerman and Tishomingo	Okla.-Tex.	1957
123-R.	Souris Loop	N. Dak.	"
124-R.	Santa Ana	Texas	"
125-R.	Laguna Atascosa	Texas	"
127-R.	Chautauqua	Ill.	1956
129-R.	Piedmont	Ga.	1958
131-R.	Bombay Hook	Del.	1957
132-R.	Desert Game	Nev.	"
133-R.	Horicon	Wis.	"
135-R.	Reelfoot and Lake Isom	Tenn.-Ky.	1958
139-R.	Bear River	Utah	1956

RL 142-R.	Upper Mississippi	Minn.-Wis.-Iowa-Ill.	1958
143-R.	Malheur	Ore.	"
145-R.	Wheeler	Ala.	"
146-R.	Sacramento	Calif.	[1956]
147-R.	Blackwater	Md.	1957
149-R.	Tennessee	Tenn.	1958
154-R.	Savannah	Ga.-S. C.	"
174-R.	Great Meadows	Mass.	"

Mammal Series.--The single issue of this series that has appeared gives a little general information about the refuge, tells where some of the conspicuous mammals may be seen, tells what mammals no longer occur on the refuge, and gives common and scientific names of mammalian species now known from the refuge.

RL 301.	Malheur	Ore.	1958	4p.

Various authors. PROTECTING DEDICATED AREAS FROM ENCROACHMENT. Nature Conservancy (4200 22d St. NE., Wash. 18, D. C.), Info. Bul. no. 27. 1-16 p., illus. May 1958. Reprinted from Recreation, June 1957.

A series of 8 articles on the problem of park lands being taken over for all sorts of purposes, public and commercial. The parks considered are primarily local ones. Many of the grabs and conversions of parks are carried through rapidly and ruthlessly. Others are being fought successfully. Parks are prime targets for every builder and highway planner, for they represent free or cheap land. Papers of this pamphlet give scores of examples. They also cite court decisions and propaganda methods of value to those fighting to save their parks.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Dementiev, G. P. (U. Moscow.) PROTECTION OF NATURE IN U.S.S.R. La Terre et la Vie 104(4): 305-317. 1957.

In French. Development of legal regulations is traced from 11th century. Earliest laws were to preserve royal sport animals such as bison, wild bull, and gyrfalcons. A law of 1763 established a no-hunting period from 12 March to 9 July. Forest regulations were begun by Peter the Great, but had little effect on landowners; the 65 million hectares of forests in Eur. Russia in early 1800's were reduced to 46 million in 60 years. Few large animals were made extinct [wild bull (Bos taurus urus), tarpan (Equus caballus gmelini), sea cow (Hydrodamalis stelleri), and great cormorant (Phalacrocorax perspicillatus)] but many populations were greatly reduced. The government is applying all widely recognized conservation techniques. Conservation methods are based on research carried out by Institutes of Acad. Sci. (of U.S.S.R. and different republics), by universities, and particularly by staffs of natural reserves. Four reserves totalling 1.5 million hectares are devoted primarily to ecological study. A special committee of Acad. Sci. was created in 1955 to coordinate research. Conservation is stressed in schools and nature organizations, such as Russian Society for Protection of Nature (1924). All resources are national property and any use must have legal basis. Forests are strictly protected in environs of villages and centers of industry. Only n. forests in lightly populated areas are fully exploited. Absolute protection throughout U.S.S.R. is provided for goral, beaver, marine otter, Eur. and axis deer, bison, flamingo, white heron, and several groups of passerines. This list is augmented by local laws of the 60 administrative units in Russia. Such local protection may include total range of an animal, as for chamois and tiger. Recently protection has been decreed for the arctic fauna: polar bear, reindeer and aquatic bird colonies. Some previously rare mammals have increased and limited hunting by authorized people is now possible: elk, Saiga tatarica, and muskrat. Introductions began in 17th century with silver fox. Muskrats were planted in 500 localities and are now important in the fur industry. Beaver were established in 50 or 60 administrative units. The Am. raccoon, Am. mink, raccoon-dog (Nyctereutes procyonoides) and nutria were established. The marten was reestablished in Siberia, and Eur. hare was introduced. Pure-blooded Eur. bison are in several reserves, and hybrid bison are maintained in nw. Caucases. Several attempts have been made to introduce eggs and young of insectivorous birds in new forest plantations.--R. M. Chew.

Rüedi, K. FOREST MANAGEMENT AND PREDATORY WILDLIFE. Schweiz. Z. Forstw. 108(7/8): 435-444. 1957. [From Biol. Abs. 32(3).]
In German. The natural fauna, including carnivorous mammals and birds, is an integral part of the forest community. Natural fauna in Switzerland, especially the predators, has been impoverished by human intervention. Several important species which have become extinct served useful purposes in the forest and should be restored where possible. Measures for accomplishing this restoration are discussed.--W. N. Sparhawk.

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Komárek, J. (Charles U., Praha, ČSR.) THE WARNING SIGNALS BY MEANS OF THE SOMATIC SYMBOLS IN HIGHER VERTEBRATES. Věstnik Českoslov. Zool. Spolecnosti 19(3): 215-222, illus. 1955. [From Biol. Abs. 32(4).]
In Czech. The different cases of bodily symbols in birds, pheasants, and mammals (deer, roe deer, hares) are remembered and exert a warning effect on the animals of the same and other species which is discussed. The analogy with the honeybee dances as a means of communication is suggested.--V. J. A. Novák.

Milne, Lorus J., and Margery Milne. PATHS ACROSS THE EARTH. Harper & Brothers, 49 E. 33d St., N. Y. 16, N. Y. 216 p. 1958. $3.75. [From review by Hugh Taylor, Am. Sci. 46(2).]
Popular yet scientific book on migrations and wanderings of many kinds of animals. "Into the record is built both sound science and entertaining reading, informative and yet enthralling."

WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Abbott, Jackson M. DEATH ON THE HIGHWAY. Va. Wildl. 19(6): 16-17, 1 fig. June 1958.
Includes table, "Wildlife traffic casualty list for one year on an 11-mile stretch of the Mt. Vernon Memorial Highway, Fairfax County, Virginia." Gray squirrel was first on this list, cottontail second, and opossum third, among mammals. Chimney swifts and robins were the birds killed in greatest numbers.

Allen, Durward L. (Purdue U., Lafayette, Ind.) PESTICIDES / A MAJOR PROBLEM FOR ANGLERS AND HUNTERS. Fisherman 9(6): 17, 84-87. June 1958.
Seriousness of the pesticide problem to sportsmen is demonstrated and documented from reports of actual pesticide operations. Among the examples: Extensive fish damage resulted from dieldrin treatments of Florida marshes. Pheasants died in groups of 10 to 60 as a result of night-spraying of Calif. orchards with TEPP. No extremist, the author recognizes the value of pesticides, urges research to find their effects and safe ways to use them. Present knowledge of relative toxicity of different chemicals is summarized. Recommended procedures for DDT use are given.--L. F. Stickel.

Cope, Oliver B., and Paul F. Springer. (US F&WS, Logan, Utah.) MASS CONTROL OF INSECTS: THE EFFECTS ON FISH AND WILDLIFE. Bul. Ent. Soc. Am. 4(2): 52-56. June 1958.
Summary: "Mass applications of chemicals for control of insects present certain new dangers to desirable fish and wildlife resources, which are not inherent in less extensive treatments. They thus impose new responsibilities on economic entomologists. The direct and indirect effects on fish and wildlife resulting from programs for control or eradication of the spruce budworm, gypsy moth, Mediterranean fruit fly, grasshoppers and the Mormon cricket are reviewed. In addition, the hazards of the imported fire ant eradication program are predicted on the basis of what already is known about the effects of the insecticides and dosages recommended in this operation. General precautions for minimizing dangers to fish and wildlife are stated. In order to obtain well balanced control programs it will be necessary for entomologists and wildlife biologists to work closely together in developing and applying methods that effectively limit insect pests while providing adequate safeguards for fish and wildlife."

Drury, Wm. H., Jr. (Drumlin Farm, S. Lincoln, Mass.) WHAT ABOUT AERIAL SPRAYING? Bul. Mass. Aud. Soc. 42(6): 306-308. June 1958.

"What we must demand is that aerial spraying be restricted to areas where man has entirely altered the natural community. Spraying, like terracing, or damming a stream, should only be entered upon where man intends to take over complete control of the biological balance, and this under the advice of biologists, not chemists or business men. We should keep our virulent control measures under close supervision, and this control should be restricted to certain built-up areas. We must avoid ignorant spraying which will destroy biological population control in natural communities. Such widespread spraying is seriously damaging to birds, to all insects, and ultimately seems to defeat the fundamental purpose of insect control."

George, John L. (Patuxent Refuge, Laurel, Md.) THE PESTICIDE PROBLEM / A BRIEF REVIEW OF PRESENT KNOWLEDGE AND SUGGESTIONS FOR ACTION. Cons. Found., 30 E. 40th St., N. Y. 16, N. Y. 1-57 p. + 10 p. appendix, mimeo. 1957. $1.50.

Effects of DDT, other insecticides, herbicides, and fungicides on wildlife are reviewed. Their broader effects on public health, soils, and food chains are also considered. The author makes some pointed remarks about the questionable necessity, handling of operations, and public relations involved in budworm and gypsy moth campaigns. Recommended are a broad program of laboratory and field studies of the action of pesticides on nature, and creation of "an evaluation committee which would review major aspects of the pesticide program and render value judgments as to the economic merits or wisdom of those programs." The evaluation committee would be non-governmental. The research program probably would have to be governmental because of its great and continuing cost.

This publication has an 8.5-page bibliography and is a good source of many facts about the pesticide problem. Readers who desire an even more detailed review of facts and references about pesticides vs. wildlife may refer to the encyclopedic work of Rudd and Genelly, Calif. Dept. Fish & Game, Game Bul. no. 7, 209 p., 1956 [see WR 87:15].

Hale, James B. (Wis. Cons. Dept.) BIRDS, BUGS, AND JACK PINES. Passenger Pigeon 19(4): 162-165. Winter 1957 [Apr. 1958].

Jack-pine budworm populations had been building up in n. Wis. for several years. Plans were made to spray 300,000 acres in 1957 with 1 lb. DDT in oil per acre. When 40,575 acres were sprayed, it was apparent that natural parasites had budworms under control, so spraying was stopped. Personnel of Wis. Cons. Dept. studied effects of spraying. 90% of budworms were killed. Bird populations were not reduced. Five mallard ducklings were found dead in one pothole. Spraying was planned to avoid water areas, but some fish and frogs were found dead in 4 small lakes that were sprayed accidentally. In general, wildlife mortality was insignificant.

Krump. [sic]. RESULTS OF A STUDY OF FIELD MOUSE CONTROL USING TOXAPHENE. Allg. Forstzeitschrift (München) 11(15). 1956. [From German abstract by Rühl in Z. Jagdwissensch. 3(1).]

In German. No damage to wildlife could be detected in a Bavarian forest following toxaphene application. Abstract does not state amount applied.--Vagn F. Flyger.

Murphy, Robert C. (Am. Mus. Nat. Hist., N. Y. 24.) THE HICK MIND IN ACTION? Am. For. 64(2): 4, 51-52. Feb. 1958.

A blast at the side effects of program to exterminate gypsy moth in NE. with DDT. Almost all fish in ponds were killed, and there was also fish mortality in streams. Pond insects disappeared. Song birds were found dead. A horse died 10 hours after its drinking water was sprayed. A crop of peas, not chemically treated except by the gypsy moth program, contained 14-20 ppm. DDT and was designated as unsafe for human consumption. Civil suit was brought against USDA and criminal negligence preceedings are recommended by Murphy when enough evidence is available. In June 1956, not long before DDT program began, USDA reported, in Tech. Bul. 1139, that imported parasites and predators had gypsy moth under appreciable control, and that future outbreaks were not likely to be worse than the relatively minor ones long known in Old World. [Judging from knowledge of DDT effects elsewhere, effects such as those described here could be produced only by dosages considerably in excess of those planned, as by accidental reruns over same areas.]

Springer, Paul F. (Patuxent Refuge, Laurel, Md.) MOSQUITO CONTROL AND WILDLIFE. Wildl. in N. C. 22(6): 14-16, 4 photos. June 1958.

Mosquito control and wildlife management can be compatible. Because of resistance of insects to insecticides, control is again turning toward water management. This provides a great opportunity for cooperation of wildlife workers. Some of the worst mosquitoes come from habitats of little wildlife value. Permanent ponds containing fish produce few mosquitoes; they should not be drained. Ditching has little or no harmful effect on wildlife where mean low-tide level is close to the surface. Ditching there may help by making more openings, more interspersion. Ditching of higher marshes is worse for wildlife, and other methods are needed. One promising procedure is to drain surface water into ditches and ponds, levels of which can be controlled. Another is diking and flooding. Value of this technique for both mosquito control and wildlife has been demonstrated in several areas, but more study is required. Insecticides should be applied with care and in minimal doses. Oil formulations are less dangerous to wildlife than emulsions. Granular formulations, which release toxicants slowly, may also prove less dangerous, and they do give satisfactory control of insects. Wildlife biologists and mosquito control men should cooperate in planning and management. Characteristics of each site should be considered. Provision should be made for adequate maintenance of projects. If conflicts of interest arise, they may be submitted to an impartial group, such as a water resources board.

Various authors. [FOUR PAPERS ON INSECTICIDES.] Passenger Pigeon 19(4): 147-165, 2 photos. Winter 1957 [Apr. 1958]. Available as pamphlet from Mrs. E. B. Miles, 3817 Winnemac Ave., Madison 5, Wis.

Spraying must be controlled! by Samuel D. Robbins, Jr., (p. 147-153) discusses the insecticide problem in general, with emphasis on kill of song birds by DDT in Dutch elm disease program, and makes 5 recommendations: 1. Keep careful records of every spraying operation. 2. Spray for Dutch Elm disease by mist-blower equipment during the dormant season. 3. Spray forests only when specific needs arise, and use light solutions. 4. State agencies should be empowered to revoke spraying licenses. 5. Carry on a vigorous sanitation program on elms. Committee of a Thousand, by Mrs. Dixie Larkin, (p. 153-156) tells of the formation of a large public group to combat losses of birds in Dutch elm disease campaigns and other insecticide programs. Recommendations are similar to those of Robbins. DDT: its effects on wildlife, by Paul F. Springer, (p. 156-161) summarizes knowledge of effects of DDT on various forms of life. Loss of birds in Dutch elm disease control can be reduced by use of mist blowers, use of methoxychlor, and other means. As for the insecticide question in general, "The problem is to find the most satisfactory means of control which causes the least damage to desirable forms of life. This does not mean that the most effective or most economical means of killing a pest is necessarily the best procedure. Nor does it imply that all damage to wildlife must be avoided. However, it does signify a responsibility for the development of balanced control programs that have due regard for all legitimate public interests." Birds, bugs, and jack pines, by James B. Hale, (p. 162-165) reports on forest spraying in which 1 lb. DDT per acre was applied in oil for control of jack-pine budworm. Effects on wildlife were slight.

Webbe, G. THE ACTION ON FISH OF SEVERAL CHLORINATED HYDROCARBONS WHEN USED AS LARVICIDES. Ann. Trop. Med. & Parasit. 51(3): 264-270. 1957. [From Mosquito News 18(1).]

World Health Organization. SELECT BIBLIOGRAPHY ON THE TOXICITY OF PESTICIDES TO MAN AND ANIMALS 1953-1955. World Health Org. Bul. 16(6): 1219-1241. 1957. [From Mosquito News 18(1).]

WILDLIFE--POPULATIONS & FLUCTUATIONS

Andrewartha, H. G. (U. Adelaide, Australia.) THE USE OF CONCEPTUAL MODELS IN POPULATION ECOLOGY. In Cold Spring Harbor Symposia on Quant. Biol. 22: 219-232. 1958.

Birch, L. C. (U. Sydney, Australia.) THE ROLE OF WEATHER IN DETERMINING THE DISTRIBUTION AND ABUNDANCE OF ANIMALS. In Cold Spring Harbor Symposia on Quant. Biol. 22: 203-215, 8 figs. 1958.

Errington, Paul L. (Iowa State Coll., Ames.) OF POPULATION CYCLES AND UNKNOWNS. In Cold Spring Harbor Symposia on Quant. Biol. 22: 287-300, 7 figs. 1958.

Population fluctuations are discussed in relation to bobwhites and muskrats in Wis. and Iowa through 2 "cyclic" highs and 3 lows. Highs were reached in or near 1941-2 and 1951-2; lows occurred in or near 1936-7, 1946-7, and 1956-7. Data from muskrats were analysed for correlations of other factors with population densities. Correlations: (1) Average sizes of litters were somewhat greater in peak years. (2) Precocious breeding was restricted to years centering about highs. (3) Changes took place in the hemorrhagic disease syndrome. (4) Crowding was less well tolerated and stress reactions occurred at lower population densities at lows than at highs. (5) Cross-country travels in summer and fall were more numerous in years of lows. (6) Muskrats abandoned home ranges more readily in droughts that occurred at cyclic lows than in those at highs. Although drought is very important to muskrats, it is not well correlated with the population cycle. Two lows were in drought years; 1 low year had normal rainfall and excellent environmental conditions. The first high started with a drought; the second ended with a drought. As to the role of stress in regulating numbers, "There is a lot more in sight than muskrat populations reaching peaks, to decline in consequence of built-up stresses... Plenty of stress can occur... not only at high numerical densities--as in 1943--but also at other times when population densities are not and have not been very high numerically, nor high in relation to visible qualities of the occupied habitat." From papers of Christian, Chitty, and others it must be concluded that stress is part of a mechanism that can regulate animal numbers. But Errington's work strongly suggests that stress may be only a terminal link in the chain--that fundamental causes are still to be found.--L. F. Stickel.

Milne, A. (King's Coll., Newcastle upon Tyne, Eng.) THEORIES OF NATURAL CONTROL OF INSECT POPULATIONS. In Cold Spring Harbor Symposia on Quant. Biol. 22: 253-267, 2 figs. 1958.

Warren, Katherine B., editor. POPULATION STUDIES: ANIMAL ECOLOGY AND DEMOGRAPHY. Cold Spring Harbor Symposia on Quantitative Biology vol. XXII. Biological Laboratory, Cold Spring Harbor, L. I., N. Y. xiv + 437 p., illus. 1957 (1958). $8.00.

Demography is defined as the statistics of populations. The field is highly mathematical and it appears in its full technicality in this great symposium in which experts from several nations present their findings and debate their theories. The volume is not for the beginner or the person of nonmathematical bent, but even these will find material of interest in several papers. Advanced students of populations will find this book a mine of fact, method, theory, and discussion. Major sections, each of several chapters, are: Human Populations; Historical Study; Demographic Theory; Animal Populations, Experimental and Theoretical; Growth of Human Populations; Ecology of Natural Populations, I, II, & III; The Structure of Communities; and Population as a Unit of Evolution. Individual papers are documented and accompanied by discussions. Many of the 36 contributions pertain directly to animal populations, but some deal primarily with genetic or human topics and others are purely theoretical or mathematical. Most of the papers in the sections on ecology of natural populations are listed individually in this issue of WR.

WILDLIFE--BIOMETRICS

Atwood, Earl L. (Patuxent Refuge, Laurel, Md.) A PROCEDURE FOR REMOVING THE EFFECT OF RESPONSE BIAS ERRORS FROM WATERFOWL HUNTER QUESTIONNAIRE RESPONSES. Biometrics 14(1): 132-133. Mar. 1958.

Abstract of paper presented at Biometric Soc. meeting, Sept. 1957. Questionnaire response bias errors of waterfowl hunters were studied. Response bias errors were very large compared to non-response and sampling errors. The negative binomial and semi-logarithmic distributions were good fits of various portions of the data. A graphical adjustment of the response distributions was made.--V. Schultz.

WILDLIFE--BIOMETRICS--Continued

Coulston, J. C., and E. White. MORTALITY RATES OF THE SHAG ESTIMATED BY TWO INDEPENDENT METHODS. Bird Study 4(3): 166-171. 1957. [From abstract by O. L. Austin, Jr., Bird-Banding 29(1).]

Estimates made from band recoveries by the conventional Lack method were grossly distorted by loss of bands by abrasion. Consequently, adult mortality of this cormorant was calculated from live recaptures. "These data, calculated by Bailey's formulas, yielded an average annual adult mortality of 14 ± 9%. The authors consider this estimate to be the more reliable, and recommend that this ' negative' method be used instead of the 'dead recapture method' in species where loss or illegibility of rings may occur." Observed recruitment was 2.27 chicks per nest.

DeLury, D. B. (Ont. Res. Found., Toronto.) THE ESTIMATION OF POPULATION SIZE BY A MARKING AND RECAPTURE PROCEDURE. J. Fish. Res. Bd. Canada 15(1): 19-25. 1958.

"The Schumacher and Schnabel estimates of population size are compared and reasons are given for preferring the Schumacher formula. This formula is extended to permit mortality and recruitment in the population. Confidence limits are provided according to standard regression theory." This is an excellent paper. The reader must, however, be familiar with maximum likelihood estimates, regression analysis, and weighting to comprehend it fully. Comparisons of the two formulae and weighting procedures were made by sampling from a population of beads. Data on lake trout are used in an estimate that allows for both recruitment and mortality.--V. Schultz.

Grieb, Jack R. (Colo. Game Dept.) WILDLIFE STATISTICS. Colo. Game & Fish Dept., Fed. Aid Div. 96 p., illus., mimeo. Jan. 1958. No price stated.

The purpose of this excellent publication is to present the basic principles of statistics and describe the commonly used statistical tests in as simple a manner as possible, with illustrations and examples from the wildlife field. The book is intended primarily for wildlife biologists with no training in statistics, but biologists with limited experience with statistics will also find it useful. "Wildlife Statistics" is especially helpful because it clearly explains some of the fundamental concepts that are basic to an understanding of the application of statistical tests to wildlife data. Biologists who have little or no training in statistics, but who have occasion to deal with quantitative data, are urged to refer to this fine work.--A. D. Geis.

Orians, Gordon H. (MVZ, U. Calif., Berkeley.) A CAPTURE-RECAPTURE ANALYSIS OF A SHEARWATER POPULATION. With a statistical appendix by P. H. Leslie. J. Animal Ecol. 27(1): 71-86. May 1958.

"When used with proper caution the capture-recapture method can be one of the most useful statistical tools available to the biologist, but this analysis of a shearwater population stresses the importance of first determining whether the data conform to the assumptions of the method. It also illustrates several means by which this can be tested and emphasizes the need for proper design of the sampling methods so that the maximum amount of information can be obtained from the field data."

WILDLIFE--TECHNIQUES

Alexander, Maurice M. (State Coll. Forestry, Syracuse 10, N. Y.) THE PLACE OF AGING IN WILDLIFE MANAGEMENT. Am. Sci. 46(2): 123-137, 7 figs. June 1958.

A good explanation of the value of aging techniques. Data on relative sizes of age groups, used with knowledge of population level and habitat conditions, make it possible to determine what is happening to a population and often why it is happening. Adjustments in management and prediction of future trend are then possible. Examples are drawn from muskrats of Montezuma Refuge, N. Y.

McCabe, R. A., and G. A. LeFage. (U. Wis., Madison.) IDENTIFYING PROGENY FROM PHEASANT HENS GIVEN RADIOACTIVE CALCIUM (Ca^{45}). J. Wildl. Mgt. 22(2): 134-141, 5 figs. Apr. 1958.

Radioactive calcium (Ca^{45}) in several compounds was given to hen pheasants and to white leghorn hens to see if the isotope could be detected in egg shells or in leg bones of progeny. $CaSO_4$ was administered as a liquid intraperitoneally

and as a pellet subcutaneously. The uptake and release of calcium was so great that use of this soluble salt was considered impractical. A second compound, $Ca_3(PO_4)_2$, appeared to be suitable, when implanted as a subcutaneous pellet, to release the isotope slowly over a period sufficient in length to allow a spring-released pheasant hen to lay a clutch of eggs containing detectable radioactivity. Once an egg is significantly radioactive, this activity is transferred to the chick and is detectable in leg bones of the young adult in the fall.--R. A. McCabe.

Platt, Robert B. (Emory U., Ga.) A FIELD INSTALLATION FOR AUTOMATIC RECORDING OF MICRO-ENVIRONMENTAL GRADIENTS. Trans. Am. Geophysical Union 38(2): 166-170, 3 figs. Apr. 1957.

Author's abstract: "A laboratory has been constructed in the field with a design sufficiently basic and flexible to permit correlation of micro-environmental conditions with distribution and abundance in space and time of a wide variety of plants and animals. Two 50-ft. wooden towers, located at ecological extremes of a dense woodland and an open field, have been equipped with instruments for automatic recording of micro-environmental gradients. Aminco-Dunmore-type electric humidity and temperature indicators have been placed at the 0, 3, 6, 15 and 50 ft. levels, and temperature elements only at the 1, 16, 18 and 36 inch soil depths, each complete set being fed into a 16-point strip recorder. Special weather shields have been designed for the humidity-temperature indicators. Recording anemometers are at the 3 and 50 ft. levels, and recording rain and surface water level gages are near the base of each tower. Portable instruments provide for supplementary environmental data on radiation, light, wind, temperature and humidity."

Rudasill, L. S., and Thurman Houser. (Md. Game Comm.) A NEW AND EASY WAY TO MAKE MORE HOMES FOR SQUIRRELS. Md. Cons. 35(2): 16-19, 9 photos. Mar. 1958.

Ingenious new way to hang nest boxes of many sorts without climbing or using ladders. In present study, sturdy ammunition boxes were obtained in quantity from an army station. They were made into squirrel boxes with little alteration. They were hung from limbs rather than fastened to tree trunks. More than half of them were used by squirrels, so the program was extended. Over 1,200 boxes were put up in 4 Md. counties in 1957. This wholesale program required a simple method of getting boxes up into trees. A metal rod that came with box was attached to box at both ends and the rest was bent into a U-shaped hook that would go over a branch. To get the box hung, rope was tossed over limb. One end of rope connected to flexible wires that connected to a double metal plate that would slip over the hook. Wires entered at bottom of double plate, so upward pull lifted box and hooked it over limb. Further pull immediately pulled double plate from hook and job was done. Photos show how simple the process and equipment really are.

Sandels, E. G. (Hydraulics Res. Sta., Howbery Park, Wallingford, Berks, Eng.) AN INSTRUMENT FOR THE MEASUREMENT OF SALINITY IN ESTUARIES. J. Sci. Instruments 33(11): 424-428. 1956. [From Biol. Abs. 32(6).]

The instrument is carried in a boat, water being pumped through it from an intake which is lowered into the estuary. Electrical conductivity and temperature are measured and the salinity is computed readily from a nomogram. Radio-frequency circuits are employed for the measurements, the indicator being a milliammeter operated from a d.c. amplifier. The accuracy is better than ± 1/3 parts per thousand over a salinity range of from 0.2-50 ppt.--Auth. summ.

Willard, C. J. (Ohio State U., Columbus 10.) RATING SCALES FOR WEED CONTROL EXPERIMENTS. Weeds 6(3): 327-328. July 1958.

Useful suggestion that may apply to various types of work. Author points out that visual ratings of plots can be made rapidly and accurately. But the rating scale should be adequate and consistent. Scales now in use vary widely; many have too few classes. A scale should have enough classes that all readily observable differences can be expressed. If you have only 5 classes, 1 must be for no effect and 1 for 100% effect, which leaves only 3 classes for degrees of effect. All classes should be reasonably describable. Classes should be essentially equal so they can be averaged without great distortion. Author recommends scale of 0 to 10, in which 0 means no effect and 10 means 100% effect. This is a decimal scale and has the advantages of a decimal system. It is, for example, compatible with a percentage system. Also, intermediate classes, if needed, can be added as decimal fractions. To preserve these advantages, it is important to keep 0 for no effect and to run the scale all the way up to 10.

WILDLIFE--MANAGEMENT & RESEARCH, GENERAL

Westerskov, Kaj. (Wildl. Div., Dept. Internal Affairs, Wellington C.1, N. Z.) TRAINING FOR THE WILDLIFE PROFESSION. N. Z. Dept. Internal Affairs, Wildl. Publ. no. 49. 1-19 p. Reprinted from N. Z. Sci. Rev. 15(9/10): 67-75. Sept.-Oct. 1957.

Reviews history of wildlife management and training in Eur. and Am. in useful and interesting detail. The paper then discusses present wildlife problems in N. Z. and the number and nature of personnel involved in the work. It concludes with recommendations for establishment of wildlife training at university level in N. Z. Professional training in wildlife work per se is not available in N. Z. or Australia. About 1700 men are now engaged full time in wildlife control or management in N. Z. Most do control, but about 20 are research men.

WILDLIFE--HUNTING AREAS & PROBLEMS

Dickey, Charley. (Rt. 2, Box 408, Greenwood, S. C.) FLIGHTING MALLARDS ON SHOOTING PRESERVES. PART 2. Modern Game Breeding 28(4): 8-17, 15 figs. Apr. 1958. [Available from Sportsmen's Service Bureau, 250 E. 43d St., N. Y. 17, N. Y.]

As now well known, the general idea is have mallards fly from a ramp near their pens, down a shooting line, to a nearby pond. This article gives much detailed, helpful information to preserve operators on type and construction of ponds, maintenance of ponds and vicinity, fencing of ponds, protection against predators, construction of pens and ramps, construction and use of blinds, and use of walkways between pens and ponds.

Dickey, Charley. (Rt. 2, Box 408, Greenwood, S. C.) FLIGHTING MALLARDS ON SHOOTING PRESERVES. PART 3. Modern Game Breeding 28(6): 8-18, 11 photos. June 1958. [Available from Sportsmen's Service Bureau, 250 E. 43d St., N. Y. 17, N. Y.]

Third and final installment. This series of articles appears to be the best guide that has yet been written for operators of duck-shooting preserves. The present installment takes up: construction of duck walk, pen, holding area, ramp, and flight platform; water at the pen; choosing the strain of ducks; how many ducks to start with; what age duck to buy; brooding; training ducks; feeding; blinds; shooting management; handling the cripple problem; charges to customers; and economics of preserve operation.

Larson, Joseph Stanley. (18 Porter St., Melrose 76, Mass.) A STUDY OF POSTING ON PRIVATE LAND IN MASSACHUSETTS. M. S. thesis, U. Mass. 106 p. June 1958.

Objectives were: to inventory posted land in Mass. by sampling; to determine reasons for posting; and to present suggestions for possible solution of the problem. Sampling was done by "cruise lines" drawn across the state to select towns and cities; a sample of tax records of these communities produced individual landowners. Over 1,000 landowners were contacted by mail questionnaire and field interview. The questionnaire produced a 70% response. Field interviews did not alter the mail information. Officials of towns that were closed to hunting were interviewed. It was found that 41% of the state was closed. Of this, 9% was in "urban areas," 9% was closed owing to restrictions on shooting near roads, 3% was closed public land, and 20% was posted private land. Of landowners who posted, 59% would permit hunting if asked. Of the 59% of the state open, 4% was public land and 55% was private. The 2 most frequent reasons for posting, outweighing all others combined, were destruction of property and shooting too close to buildings. It was recommended that the state combat posting by continuing the "Safety Zone" program, offering "Safety Zone" posting as an alternate to closure of towns, acquiring more land for public shooting grounds, creating commercial shooting preserves, providing more conservation officers, and above all, by campaigning for improved sportsman ethics. It was felt that the problem could be relieved only by sportsmen improving their behavior in the field.--Author.

WILDLIFE--INTRODUCTIONS

Barrau, Jacques and Louis Devambez. SOME UNEXPECTED RESULTS OF INTRODUCTIONS IN NEW CALEDONIA. La Terre et la Vie 104(4): 324-334, 4 figs. 1957.

In French. Several introduced organisms now dominate savannahs on w. sides of the islands; some benefit from cattle raising there. Introductions of hares, guinea pigs, quail, partridges and pheasants between 1862-70 were failures, but deer (Cervus unicolor) and mynas (Acridotheres tristis) flourished. Twelve deer released in 1870 increased to an estimated 200,000 by 1950. Deer (along with 140,000 domestic animals on 700,000 hectares of natural pasture) have increased erosion by destruction of pastures, and also damage crops. However, deer are an important item in the diet of natives and colons, and are highly desired for sport. Horns and hides (approximately 20,000/year) are exported, but this industry fluctuates considerably with the price of hides, supply of ammunition and employment opportunities. The myna was introduced in 1871 for its value as a feeder on cattle ectoparasites; 17 birds multiplied to become "as the sparrows in Paris." Mynas may have contributed to the decline of the cattle tick (Boophilus microplus) introduced on U. S. army horses during the war and very destructive of island cattle, but they are in balance with other ectoparasite populations. In the cattle areas the original dry forests of Acacia spirorbis and Casuarina collina were largely replaced by introduced tropical Am. plants that were deliberately planted in pastures or escaped from cultivation. Of the native forests, only those in mountains and areas of higher rainfall still persist.--R. M. Chew.

Bump, Gardiner. (US F&WS.) NEW BIRDS FOR OLD. Colo. Outdoors 7(2): 1-6, 8 figs. Mar.-Apr. 1958.

Popular article on why private introductions of game birds are undesirable, and why and how the author's introduction program operates. Includes 2-p. table of information about chukar, red-leg, seesee, Iranian black-necked pheasant, black francolin, gray francolin, black-bellied sandgrouse, and coturnix. Table gives information about range, habitat, climatic adaptation, food, reproduction, weights, and habits. Cover of the issue shows all 8 species in color.

WILDLIFE--ECONOMIC & OTHER VALUES

Armstrong, W. W. THE ECONOMIC VALUE OF HUNTING AND FISHING IN ARIZONA IN 1956. Ariz. Game & Fish Dept., Wildl. Bul. no. 4. iv + 36 p., illus. Feb. 1958.

"Estimated figures based on the returned questionnaires showed that resident sportsmen spent $39,795,000 or an average of $302.12. Nonresident sportsmen spent $3,300,000 or an average of $161.44. These figures do not include the $900,000 spent for licenses and permits" etc. "Fishing ranked first in popularity and amount of expenditures for both resident and nonresident sportsmen. Fifty-five percent of the resident and over 73 percent of the nonresident expenditures were for fishing." Chief expenditures were for travel, food and lodging, boats and motors. Among types of hunting, deer and small game caused most spending. Other types of hunting were not of great economic import. In all, however, sportsmen spent about $44 million. This is more than twice the value of all gold, silver, lead and zinc produced in the state that year. It is almost as great as all rental income in the state.

Buckley, John L. (USF&WS, Wash., D. C.) WILDLIFE IN THE ECONOMY OF ALASKA. Biol. Papers U. Alaska, no. 1 (Revised). ii + 33 p., 6 figs. Dec. 1957. 50¢.

A detailed economic appraisal for 1957. Commercial, recreational, scientific, and esthetic values are considered and methods are explained. Total annual value was $123,156,809--more than 250% greater than that of all other natural resource industries of Alaska combined. It was 20 times as great as agriculture, 10 times forestry, and 3 times mining. It was greater than mining even if the main item, commercial fisheries, were excluded. About 60,000 people, half the wage earners in Alaska, were dependent on wildlife to some extent. About 30,000 people occupying 1/3 of Alaska depended on wildlife for food. Commercial values came to $101,547,059; fisheries, furs, and food were main items. Recreational values, as determined from expenditures, were $17,018,500. Transportation was chief item, followed by food and lodging. Sport fishing accounted for more than half of expenditures, big game for 27%, small game for 12%, and waterfowl for 7%.

The av. sportsman spent 16.6 days afield and spent $279 (based on 1952 data). Numbers of license buyers rose from 43,421 in 1952 to 59,510 in 1957. Management and research costs were only 4%, which is excessively low in comparison with equivalent costs in business and industry.

Hay, Keith. (Colo. Dept. Game.) WILDLIFE BONANZA. Colo. Outdoors 7(4): 1-4, 4 figs. July-Aug. 1958.

Economic value of wildlife in Colo. in 1957. Fish and game are the basis of an $81,000,000 industry. This sum exceeds the combined value of molybdenum, gold, silver, copper, lead, and zinc produced in the state. Nearly half the money spent on hunting and fishing in Colo. is spent by people from out of state. Out-of-state deer hunters spent an av. of $277 while resident deer hunters spent $79. Big game hunters alone spent $18,792,433. Residents spent an av. of $31 to bag an antelope, $53 for a turkey, and $295 for a bighorn. The av. pheasant hunter spent $47. An av. resident trout fisherman spent $94. Estimated value of meat obtained by hunting was $5,153,805 for deer and $1,484,210 for elk.

WILDLIFE--FOOD HABITS & TECHNIQUES

Myers, Raymond J. (Colgate U., Hamilton, N. Y.) THE STRUCTURE AND IDENTIFICATION OF HAIR. J. Assn. Off. Agr. Chem. 41(2): 368-376, 6 figs. May 1958.

An introduction to techniques and fundamentals of hair identification. The problem of actual identification is solved by simply referring the reader to references, 31 of which are cited. Martin Brown's relatively good paper on carnivore hairs was missed. The author strongly implies that published hair keys are workable and reliable. [In the reviewer's experience, most hair keys are highly unreliable because they cannot take adequate account of variation; they should be used only as aids.]

Smith, Frank R. (Food & Drug Admin., Wash. 25, D. C.) THE EFFECT OF NATURAL AND LABORATORY DIGESTION ON THE MICROSCOPIC APPEARANCE OF CERTAIN ANIMAL HAIRS. J. Assn. Off. Agr. Chem. 41(2): 479-480, 2 figs. May 1958.

WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Balser, Donald S., and John B. Moyle. (Minn. Dept. Cons.) PREDATORS IN MINNESOTA / THEIR ROLE AND CONTROL. Minn. Dept. Cons., Info. Bul. no. 1. 1-20 p., 5 figs. 1958.

Extension pamphlet aimed at Minnesota's bounty system, which wastes as much as $187,832 a year of game funds. The pamphlet shows how predators may be "good" or "bad" depending on circumstances; tells why predators are rarely abundant; explains why killing large numbers of predators seldom lowers the population; discusses food habits of the major predators; gives factual examples of small-game populations fluctuating or increasing in the face of rising fox populations; recommends elimination of individuals doing damage; points out the desirability of preserving wolves as part of the Minn. wilderness; gives figures on numbers of foxes, wolves, coyotes, bears, and bobcats bountied in the state, 1945-57; compares bounties paid in Minn. with those of nearby states (some of which have succeeded in abolishing or reducing their bounties); itemizes the drawbacks of bounties in general; and points out that various states and provinces have had fine results with paid-trapper or extension-trapper systems.

Eygenraam, J. A. BONE TAR OIL AS A REPELLENT FOR GAME. Instituut voor Toegepast Biologisch Onderzoek in de Natuur (Kemperbergerweg 11, Arnhem, Netherlands), Mededeling no. 35: 811-816 + 4 p., 1 photo. 1957. Reprinted from Landbouwkundig Tijdschrift 69(10), Oct. 1957.

In Dutch. English summary: "A preliminary report is given about an investigation regarding the protection of agricultural, horticultural and forest crops from damage by hares, red deer, roe deer and rabbits. Such protection could be obtained by putting a 1/8" string impregnated with bone tar oil (Oleum animale foetidum) round the field concerned. The most effective height varied with the size of the game species: 15-20 cm for rabbits and hares, 70 cm for roe deer and 120 cm for red deer. The results of observations are summarised in table 1.

Cases in which no damage occurred within one month are marked with the symbol +; less favourable results with -. The method proved to be more effective against hare and red deer than against roe deer and rabbits. The costs amounted to about D fl. 5.- per 100 m for the first application. The material could be used more than once. Protection lasted for at least one to two months. The investigations are being continued in order to obtain more precise information on the factors which cause the animals to stay away from the protected fields."

Johnson, Morris. (N. Dak. Game Dept., Bismarck.) MIDWEST SURVEY. N. Dak. Outdoors 20(10): 10-12, 15. Apr. 1958.

Survey of facts and beliefs about bounties. State and provincial game authorities (from Mont., Sask., Man., and Mich. south to Mo. and Nebr.) were asked what bounties were paid in their areas, what percentage bounties took of departmental income, how the bounties were working, and what the authorities thought of bounties. Results are tabulated and discussed. In no state or province are bounties considered successful. They are viewed as a virtually useless expense. Predators generally increase or decrease regardless of bounties. Several states have gone out of the bounty business and the others would like to. Paid trappers or extension trappers are preferred. Much public relations work is being done to get bounties abolished where they exist. Counties still pay bounties in some states that have no state bounties.

Schorger, A. W. (Dept. Wildl. Mgt., U. Wis., Madison.) MUTINY ON THE BOUNTY. Wis. Acad. Rev., Winter 1958. 3 unnumbered p. in reprint, 1 photo. 1958.

Brief review of published information on bounties. Shows that bounties are intolerably expensive, rarely serve the intended purpose, encourage fraud, and endanger rare species.

WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Arizona. ANNUAL REPORT, 1954-55, ARIZONA GAME AND FISH DEPARTMENT. 35 p., illus. 1956?

A well-illustrated report that presents data on finances, lists Federal Aid projects and their costs, discusses land acquisitions and their values, tells of work in education, and reviews certain fishery activities.

Branch of Federal Aid, Fish & Wildlife Service. FEDERAL AID IN FISH AND WILDLIFE RESTORATION / ANNUAL REPORT ON DINGELL-JOHNSON AND PITTMAN-ROBERTSON PROGRAMS 1957. Wildl. Mgt. Inst. (Wire Bldg.) and Sport Fishing Inst. (Bond Bldg.), Wash. 5, D. C. iv + 93 p., illus. Rec'd. Apr. 1958.

The bulk of this report is a list, by states, of all PR and DJ projects, with brief descriptions and statements of costs. A special pictorial feature deals with accomplishments in acquiring and developing areas of access to fishing or hunting opportunities. One table reports on land purchases approved during the year. Other tables present financial statements for both programs.

British Columbia. PROVINCIAL GAME COMMISSION REPORT FOR THE YEAR ENDED DECEMBER 31ST 1956. Dept. Recreation & Cons., Victoria. 1-54 p. 1958.

Much of this report consists of narrative regional reports that discuss the status of game species, fur animals, and predators in the regions. These regional accounts provide much useful and interesting information of a qualitative or semiquantitative type. A separate section discusses predator control and gives figures on predators and so-called "vermin" destroyed. Tables supply data on the kill of ducks, grouse, pheasants, deer, and moose, 1954-56; and, by species, on pelts on which royalties were collected. The registered trapline system was continuing to work well but low fur prices lowered the catch. Game conditions in most areas were good and the 10-year cycle of game birds was on the upswing. The larger predators were brought under a satisfactory degree of control. Feral dogs were considered 1 of the major predator problems. Cougars were scarcer; marked long-term fluctuations in numbers of cougars are pointed out. Grizzlies were holding their own in some areas but slowly declining in others.

CONSERVATION FOUNDATION, ANNUAL REPORT FOR THE YEAR 1957. Cons. Found., 30 E. 40th St., N. Y. 16, N. Y. 1-39 p. [1958.]

This report of the tenth year reviews the history and objectives of the Foundation. Work in 1957 included sponsorship of the following: a book by Lionel A. Walford concerning resources of the sea, a critical analysis of the government's data collection and evaluation in the field of water resources, a statistical analysis of factors involved in crop yield, a compendium of water law, human population studies in Jamaica, a review of the pesticide problem in relation to wildlife, a study and summary of African wildlife problems, a study of and recommendations for an Arctic wildlife refuge in Alaska, a survey of the status of bighorn sheep and pronghorn antelope in n. Mexico. The Foundation was active also in conservation education for all levels of schools as well as for the general public through radio, television, and films.

Missouri. ANNUAL REPORT OF THE MISSOURI CONSERVATION COMMISSION, FISCAL YEAR JULY 1, 1955 TO JUNE 30, 1956. 73 p., graphs. [1957.]

Management areas are listed with indication of size, location, and purpose. Acquisition and development projects are similarly reported. Federal Aid research projects for the period 1938-55 are listed and their major results are stated. Tabular data are presented on: (1) Deer kill, 1944-55; it rose from 583 in 20 counties to 8,646 in 61 counties. (2) Fur take, by species, 1954-56. (3) Waterfowl kill on management areas, 1955. (4) Kill of quail, rabbits, squirrels, and doves in 1955-56. Game conditions and changes in them during the year are discussed.

New Jersey. ANNUAL REPORT OF DIVISION OF FISH AND GAME FOR THE FISCAL YEAR COMMENCING JULY 1, 1956 AND ENDING JUNE 30, 1957. 1-68 p., illus. [1958.]

A condensed report that presents data on finances, enforcement, education, game-farm production, etc. Estimated kills of major types of game are listed. Research projects are reviewed briefly. Work done on management projects is listed. It is significant that the number of hunters increased slightly, but that posting of land against hunting increased rapidly.

Nova Scotia. REPORT OF THE DEPARTMENT OF LANDS AND FORESTS, FISCAL YEAR ENDING MARCH 31, 1957. Queen's Printer, Halifax. 103 p., illus. 1957 [1958].

The section on wildlife, p. 56-103, contains much worthwhile information. Harrison F. Lewis presents a special report on his investigation of charges that double-crested cormorants were doing damage by eating young salmon and raiding fish traps. Field study revealed few cormorants on streams and only trivial damage at fish traps. Claims of damage were found exaggerated and virtually baseless. Food habits study proved that the cormorants examined had not eaten salmon at all and that their feeding on other fish was economically about neutral. Literature shows that no cormorant has ever been known to eat an Atlantic salmon; only 1 study found that any trout were eaten. Another report in the volume is on a special moose survey. Areas of moose abundance were located and a restricted, local season was recommended; the season has been closed completely since 1937. The kill of deer in 1956 was down from 1955 owing to severe winter-kill in 1955-56. Apparently a 6-week, 2-deer season has not afforded a heavy enough harvest to prevent overpopulation and winter-kill. Tables show deer kill, by county and sex, for 1956; hunter success for deer, 1956; deer age ratios; deer kill, 1916-56, by county; moose kill, 1908-37, by county; bears bountied 1942-56; furs, by species, exported from N. S.; and results of beaver trapping in 1956.

Phelps, Chester F. (Va. Comm. Game.) VIRGINIA'S DEER HERDS INCREASING. Va. Wildl. 19(5): 20-21. May 1958.

Bear, turkey, and deer kills are tabulated by county for 3 years, 1955-1958. Total bear kill varied from 156 to 135 and 213. Total turkey kill fluctuated from 2,797 to 2,470 and 2,060. Total deer kill increased from 14,227 to 20,861 and 22,473.

Saskatchewan. ANNUAL REPORT OF THE DEPARTMENT OF NATURAL RESOURCES FOR THE FISCAL YEAR ENDED MARCH 31, 1957. Queen's Printer, Regina. xii + 123 p., 52 figs. 1957 [1958].

Report of Game Branch (p. 21-39) gives general picture of activities and game conditions. Tables present material of reference value on kills of each type of big game in 1956, kills of various kinds of game birds in 1956, and catches of fur animals (by species and value) in 1955-56 and 1956-57.

Chamberlain, James Luther, Jr. AN ECOLOGICAL STUDY OF A GULF COAST MARSH, ROCKEFELLER REFUGE, GRAND CHENIER, LOUISIANA. Ph.D. thesis, U. Tenn. 160 p. 1957. [From long abstract in Dissertation Abstracts 18(4).]

Soil and water salinity and water levels in different parts of the 86,000-acre marsh were measured through the season. Maps of marsh vegetation correlated well with soil salinities and reflected adjustments to soil development and water levels. Plant use was studied by analysis of 1251 gizzards of 17 species of wintering waterfowl. Foods varied in different types of marshes and it was concluded that availability was the primary factor influencing use.-- L. F. Stickel.

Chancellor, Aylwin P. THE CONTROL OF AQUATIC WEEDS AND ALGAE. Ministry of Agr., Fisheries & Food, London. 1-20 p. 1958. 2s 6d from H. M. Stationery Office, London.

Summary: "This report attempts to cover very briefly the whole subject of aquatic weeds and their control. A general survey of biological, mechanical and chemical control in relation to the type of weed is followed by notes on those chemicals most commonly used. Information on the control of algae is given at the end in a separate section." Chemicals discussed for weed control are: sodium arsenite, monuron, 2,4-D, MCPA, trichloroacetic acid, sodium chlorate, and dalapon. Data are given on mode of application, plants against which effective, and toxicity to fish and higher animals. Chemicals discussed for control of algae are: copper sulfate, copper sulfate and lime, chlorine, sodium arsenite, rosin amine compounds, and 2,3-dichloronaphthoquinone.

Cook, Arthur H., and Charles F. Powers. (N. Y. Cons. Dept.) EARLY BIOCHEMICAL CHANGES IN THE SOILS AND WATERS OF ARTIFICIALLY CREATED MARSHES IN NEW YORK. N. Y. Fish & Game J. 5(1): 9-65, 24 figs. Jan. 1958.

Abstract: "Shallow-water environments were studied over a 2-year period in six artificially-created marshes. Special attention was given to site selection, chemistry of the soils of the drainage areas and of the marsh basins. In addition, changes in marsh soil chemistry following flooding or drainage were evaluated in conjunction with data for thermal and chemical stratification of the water. Site selection based on herbaceous vegetation prior to flooding could not be related to productivity of the flooded site. Submergence of woody vegetation, which was killed by flooding, resulted in water of lower transparency, and woody material on the marsh floor reduced the area available for plant growth. Marshes surrounded by good agricultural soils were more productive of food and cover plants than those surrounded by degraded lands. Soil analysis, except for certain of the trace elements, indicated that soils of marsh basins were more fertile, per se, than those of the contiguous drainage areas. Excessive concentrations of soluble iron and manganese were noted. Strong thermal and chemical stratification was noted in the water of marshes studied. Data, when related to marsh management, point to possible dangers of frequent drainage and the need for removing surface as opposed to subsurface waters in a normal plan for handling excess runoff. Drainage, to be effective, must result in aeration of marsh soils. In this way, organic matter may be sharply reduced and the capacity of the environment to produce conditions for the solution of iron and manganese in excessive concentrations thereby inhibited. Fertilization of marshes with the usual fertilizer elements (nitrogen, phosphorus and potash) would seem unnecessary. Liming with calcium and magnesium as monocarbonates may be of singular importance for regulating pH for maintaining nutrient salt balances, for effecting a stronger buffer system, and as an aid in maintaining favorable transparency of the water."

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) WILDLIFE AND WATER CONSERVATION. J. Soil & Water Cons. 13(2): 65-69, 7 photos. Mar. 1958.

Shows, with numerous examples, how sound use of land and water is good for both man and wildlife. Also points out how certain current development projects could be improved from the wildlife viewpoint.

Eipper, A. W., and H. B. Brumsted. HOW TO CONTROL WEEDS AND ALGAE IN FARM PONDS. N. Y. Coll. Agr. (Ithaca, N. Y.), Cornell Ext. Bul. 1014. 32 p., 12 figs. May 1958. No price stated.

Good practical pamphlet with plenty of background information and precautionary explanations. It briefly discusses proper pond construction, fertilization, and mechanical control. More attention is given to control with chemicals. Formulas and formulation tables are provided. Copper sulfate is recommended for algae, sodium arsenite for submersed plants, 2,4-D for floating plants, and amino triazole for emergent plants.

Graham, C. J. NEW DEVELOPMENTS IN SUBMERSED AQUATIC WEED CONTROL. Calif. Weed Conf. Proc. 9: 67-72. 1957. [From Weeds 6(3).]

Hopkins, W. L. CATTAIL AND TULE CONTROL. Calif. Weed Conf. Proc. 9: 29-33. 1957. [From Weeds 6(3).]

Hosner, John F. (S. Ill. U., Carbondale.) THE EFFECTS OF COMPLETE INUNDATION UPON SEEDLINGS OF SIX BOTTOMLAND TREE SPECIES. Ecology 39(2): 371-373. Apr. 1958.

Report of laboratory experiments. Conclusions: "This study suggests that floods in bottomland hardwood areas during the growing season exercise a selective effect upon the species of tree seedlings surviving. Under conditions similar to those in this study it seems that only willow seedlings can survive 32 or more days of complete inundation. Where complete submergence occurs for half that period, many ash, some redgum and possibly a few boxelder can survive. Cottonwood and silver maple seedlings survive only with less than 16 days inundation. The rate of recovery of the surviving trees also varies. In general, the willow and ash recovered quickly whereas the others showed the effects of submergence for longer periods of time."

Kadlec, John A. (Wildl. Exp. Sta., Houghton Lake Heights, Mich.) AN ANALYSIS OF A WOOLGRASS (SCIRPUS CYPERINUS) COMMUNITY IN WISCONSIN. Ecology 39 (2): 327-332. Apr. 1958.

Study of certain marsh types at Necedah Natl. Refuge. "These types were distinguished: woolgrass-grass, woolgrass-spikerush, and woolgrass-sedge. Analysis showed these types to be related to water depths and allowed development of a hypothesis of the successional trends of these units. The dominance of woolgrass in a community similar in almost all respects to cattail communities was probably due to the pattern of water level fluctuation. The results of this study indicate a close ecologic relationship between cattail and woolgrass."

Lawrence, J. M. METHODS FOR CONTROLLING AQUATIC WEEDS IN FISH PONDS WITH EMPHASIS ON USE OF CHEMICALS. Ala. Poly. Inst., Agr. Exp. Sta. (Auburn), Prog. Rep. Ser. no. 69. 1-sheet folder equal to 8 pages. Mar. 1958.

"This report summarizes in tabular form by plant groups all pertinent information concerning control methods used for the more objectionable water weeds, with major emphasis on their application to fish ponds. Also included are summaries of toxic effects of chemicals on fish as well as on higher animal forms."

Matthews, G. V. T. (Wildfowl Trust, Slimbridge, Gloucestershire, Eng.) FEEDING GROUNDS FOR WILDFOWL / THE PROVISION OF FEEDING GROUNDS FOR WILDFOWL ON AGRICULTURAL LAND. Ninth Ann. Rep. Wildfowl Trust, p. 51-57. 1958.

In Britain it is not practicable to grow crops for waterfowl or to create marshland for them. But there is a compromise that favors both wintering ducks and agriculture. This is the use of "water meadows," in which shallow water is allowed to flow over pasture lands during the winter. Periods of flooding and drying are alternated. From the agricultural viewpoint, water meadows bear early and yield exceptionally high-grade forage. Matthews gives a good discussion of how systems of this sort work, how long they have been successful, and what forage species are best adapted to them. Modern economics work against general commercial use of water meadows, but such areas should be quite feasible for waterfowl management. Present equipment would make their creation and use easy. No great amount of land would be needed for a unit: 3 rotationally flooded fields of 10 acres each would take care of large numbers of ducks. Such units should, of course, be located near reservoirs or other resting areas. [The systems described might well be considered for various sites in America where there are problems of reconciling farming and waterfowl.]

Peterson, Liven A., Jr. VEGETATIVE CHANGES AT A NEW RESERVOIR IN NEBRASKA 1951-56. US F&WS, Mo. River Basin Studies, Billings, Mont. ii + 19 + 2 p., 32 photos, map, graph. Aug. 1957.

Harry Strunk Lake, a reservoir on Medicine Creek in Frontier Co., sw. Nebr., has an area of 1,860 acres and is on loess soil. Revegetation of the margins was studied for the first 5 years. Most of the story is told by photos and long legends, but the situation, results, and their wildlife implications are discussed in text. Natural revegetation of the 30-mi. shoreline was generally good, owing to soil, topography, fortunate fluctuations of water level, and exclusion of livestock. Recommendations are made for capitalizing on such situations for development of wildlife habitat.

Sincock, John L. (Fla. Game Comm.) WATERFOWL ECOLOGY IN THE ST. JOHNS RIVER VALLEY AS RELATED TO THE PROPOSED CONSERVATION AREAS AND CHANGES IN THE HYDROLOGY FROM LAKE HARNEY TO FT. PIERCE, FLORIDA. Fla. Game & Fresh Water Fish Comm., Fed. Aid Proj. W-19-R. vi + 122 p., graphs and maps, mimeo. May 1958.

Detailed administrative report on probable effects of flood-control works proposed by Army Engineers. This report contains: results of waterfowl surveys, study of hunting pressures, study of vegetation present, wildlife values of present vegetation, alterations of vegetation that would be caused, effects on wildlife, and recommendations for changes in plans. Includes 24 tables and numerous graphs.

Srivastava, M. G. (Bose Inst., Calcutta.) "MERCENE SPECIAL" AS AN ERADICATOR OF WATER HYACINTH. Sci. and Culture 22(4): 242-244. 1956. [From Biol. Abs. 32(6).]

The use of arsenical weedicides "Mercene special" and "Mercene special A" should be recommended with reservations.

Stephens, J. C., A. L. Craig, and D. S. Harrison. CONTROLLING SUBMERSED WATER WEEDS WITH EMULSIFIABLE SOLVENTS IN SOUTH FLORIDA. Fla. Agr. Exp. Sta. C. S-97. 14 p. June 1957. [From Weeds 6(3).]

FARMLAND & WILDLIFE

Anderson, Wallace L., and Lawrence V. Compton. (US Soil Cons. Serv.) MORE WILDLIFE THROUGH SOIL AND WATER CONSERVATION. US Soil Cons. Serv., Agr. Info. Bul. no. 175. 16 unnumbered p., illus. Mar. 1958. 10¢ from Supt. Documents.

Extension leaflet. Good large photographs accompanied by paragraphs of text show many practices that are good land use and good for wildlife. "Hunting and fishing opportunities are affected by the way farmers and ranchers manage their land... Only farmers and ranchers can make effective decisions regarding wildlife production on their land."

Anon. SORGHUMS FOR WILDLIFE. Ohio Cons. Bul. 22(3): 3, 26, 3 photos. Mar. 1958.

Sorghum of some variety can be grown in any soil in Ohio that will grow corn. Sorghum planted along a woods border provides top food and cover for quail and pheasants and is also used by rabbits. Short hybrid sorghums do not interfere with mechanical corn pickers. Sorghum can be interplanted with corn "by tossing a few handsful of sorghum seed in with the fertilizer on the last round of corn." Odd areas or strips are good places for sorghum. Planted in patches, it often stops running birds. Planted strips should be not more than 50 ft. wide, so that birds will not double back around hunters. Dwarf varieties such as Martin, Westland, and Redbine are best for cover and hunting ease. Martin seems best for Ohio. Addresses of seed dealers are given. In planting, prepare ground as for corn, but plant only 1/2 in. deep. Plant about 15 lbs. seed per acre. Fertilize as for corn. Plant at same time as corn or a little later. Attractiveness of sorghum plots for game can be increased by planting some millet with the sorghum; this gives more variety of food and a bit more ground cover.

Buss, Irven O. (State Coll. Wash., Pullman.) PLANT SUCCESSION ON A SAND PLAIN, NORTHWESTERN WISCONSIN. Trans. Wis. Acad. Sci., Arts and Lett. 45: 11-19, illus. 1957. [From Biol. Abs. 32(4).]

Plant succession was studied on abandoned farm lands in light sandy soil in se. Dunn Co., near the prairie-forest border. Abundance of 25 spp. on sites abandoned for periods up to 35 years is presented. The oldest plant stage was herbaceous and of prairie type. Plants observed on undisturbed sites included those observed in the older succession stages.--W. Churchill.

Gysel, Leslie W., and Walter A. Lemmien. (Mich. State U., E. Lansing.) A TEST OF COMBINE VARIETIES OF SUNFLOWERS IN WILDLIFE FOOD PATCHES. Mich. State U., Quart. Bul. 40(4): 806-810, 1 photo. May 1958.

Combine varieties are 2.5 to 5 ft. high. Their heads are smaller than those of tall varieties and their production of seed in pounds per acre usually is lower. Production ran from 891 to 1811 pounds in authors' trials with planting in May. Combine varieties could be harvested in 75-95 days as compared with 115-120 days for tall varieties. June plantings of combine varieties produced more heavily than May plantings. Seeds contain 24-30% oil, 15-21% protein, and 20-25% digestible carbohydrate. They are also high in the vitamins niacin and thiamine. They are thus a food of high quality. They are highly palatable: most left on plants were eaten by mid-Dec., chiefly by small birds. Combine varieties remained erect; tall varieties often bent to ground, where seeds were more available to mice than birds. Short varieties probably would be more easily harvested by machines. Sunflowers did well and were utilized well when planted with corn in food patches. Combine varieties tested were Sunrise, Advance, and Arrowhead. Tall varieties compared were Black Manchurian and Greystripe.

Hankla, Donald J., and Bobbie Joe Verts. (N. C. Wildl. Resources Comm.) PLANNING FOR WILDLIFE ON THE FARM. N. C. Wildl. Resources Comm., Fed. Aid Proj. W-25-D. 20 unnumbered p., 14 figs. Jan. 1958.

Attractive extension bulletin. Tells where to plant, when to plant, how to plant, and how to maintain the following: shrub lespedeza, multiflora rose, sericea lespedeza, annual lespedeza, annual seed mixture, ladino clover, perennial grasses. Other practices that are of value to game are listed. A sample farm plan is provided.

Krieger, Jerry. (Farm editor of News-Palladium, Benton Harbor, Mich.) MULTIFLORA FENCES--A HAVEN FOR WILDLIFE. Soil Cons. 23(11): 224-225, 1 photo. June 1958.

The hard winter of 1957-58 gave farmers of Berrien Co., Mich. a chance to observe wildlife features of multiflora hedges. Small birds visited the hedges in swarms and eventually cleaned off the fruits. Quail, pheasants, and rabbits also used the hedges. The farmers reported no difficulty with multiflora spreading into fields. Also, some of the best grain yields came right next to multiflora hedges, probably because the hedges trapped snow and thus provided extra moisture.

Biswell, H. H., and A. M. Schultz. (U. Calif., Berkeley.) EFFECTS OF VEGETATION REMOVAL ON SPRING FLOW. Calif. Fish & Game 44(3): 211-230, 18 figs. July 1958.

Vegetation of Calif. rangeland was altered by cutting or burning. Increases in spring flow resulted, often almost immediately. Amount of increase varied with many factors, which are discussed. "Three principles govern spring and stream flow changes resulting from plant-cover manipulations: (1) conversion from deep-rooted species, trees and shrubs, to shallow-rooted species, grass, makes the water in the deeper zones--below the grass roots--available for spring flow. (In our studies the conversions were largely to annuals which are dry during the summer months); (2) removal of transpiring surface of plants whose roots are in free water results in immediate increases in spring and stream flow; (3) practices which decrease the infiltration capacity of the soil resulting in high surface runoff may retard spring flow or stop it altogether."

Brown, Harry E. (Rocky Mtn. For. & Range Exp. Sta., Ft. Collins, Colo.) GAMBEL OAK IN WEST-CENTRAL COLORADO. Ecology 39(2): 317-327, 4 figs. Apr. 1958.

Study of history, forage production, soil conditions, effects of fire, ground cover. The stands do not seem to be spreading. They become thicker with fire, thinner with age. Production of grasses and sedges was about equal under oak and in openings. Utilization of grass and sedge av. 24% on all sites. Ground cover and soil stability were better under oak than in openings.

Burcham, L. T. CALIFORNIA RANGE LAND. Calif. Div. For., Sacramento. 261 p., illus. 1957. $3.00. [From review by H. A. Hjersman, Calif. Fish & Game 44(2).]

"At the time of the arrival of the 'Anglo-Americans' in California, the livestock industry had already been established for nearly three-quarters of a century. Native perennial grasses had been largely replaced with annual native and introduced plants, from the Mediterranean in the most part. However, although Burcham considers perennials to have been dominant in the pristine Central Valley, he is certain that in some areas the annuals made up the greater part of the cover composition. A study of the bibliography discloses the scope of detection required of the author in order to piece together the bits of information about California's early rangelands. This work in itself would have furnished sufficient reason for publication. The trend in livestock kinds and numbers is traced from 1850 to the present and is broken down to individual counties. It is pointed out that the average live weight of stock on the ranges increased about 25 percent during the last century; that fact alone depicts the continually increasing demands on the range resources. The last quarter century has shown a reversal of the downward trend of the range. The development of range evaluation techniques, proper grazing techniques, and range improvement have furnished the tools for further improving the range. Burcham has not neglected wild species in his evaluation of the rangelands. The only drawback is that elk, deer, and antelope are not indexed; a search of the text is needed to learn, for example, that 'The pronghorned antelope was the most important game animal.' Despite this shortcoming, this book should be in the library of every person concerned with California ranges, whether that concern be big game or livestock."

Cable, Dwight R. RECOVERY OF CHAPARRAL FOLLOWING BURNING AND SEEDING IN CENTRAL ARIZONA. US For. Serv., Rocky Mtn. For. & Range Exp. Sta. (Ft. Collins, Colo.), Res. Notes no. 28. 6 p., 2 photos. Nov. 1957.

Ellison, Lincoln, and Walter R. Houston. (Houston: US Dept. Agr., Miles City, Mont.) PRODUCTION OF HERBACEOUS VEGETATION IN OPENINGS AND UNDER CANOPIES OF WESTERN ASPEN. Ecology 39(2): 337-345, 3 photos. Apr. 1958.

Lewis, J. K., and others. INTENSITY OF GRAZING; ITS EFFECTS ON LIVESTOCK AND FORAGE PRODUCTION. S. Dak. Agr. Exp. Sta., Brookings, Bul. no. 459. 44 p., illus. 1956. [From J. For. 56(5).]

Nord, Eamor C., and Bert Knowles. RICE HULLS IMPROVE DRILLING OF BITTERBRUSH SEED. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 134. 1-5 p., 1 graph. Feb. 1958.

Describes results of drill tests and outlines procedures for seeding bitterbrush (Purshia tridentata) by mixing the seed with rice hulls to give uniform seed distribution on game-range sites with standard fluted feed grain drills. Operating hints and a planting chart for seeding at rates between 2 and 8 pounds per acre are set forth.--E. C. Nord.

Spaulding, C. K. (Sitgreaves Natl. For., Holbrook, Ariz.) THE HEBER TRICK TANK--A CISTERN FOR STOCK WATER. J. For. 56(6): 429-430, 3 figs. June 1958.
A sheet-metal catchment of 1/3 acre is elevated on cedar posts and drains into a steel tank, coated with asphalt, that holds 70,497 gallons. Water is piped into troughs equipped with float valves. Details are provided. Such an outfit is not cheap, but it provides large amounts of water for stock in an area where wells are uncertain and costly and soils are too pervious for dirt tanks or ponds. No comparisons are made with the various guzzlers constructed especially for wildlife.

FORESTLAND--FORESTRY & ECOLOGY

Gaines, E. M., H. R. Kallander, and J. A. Wagner. (Rocky Mtn. For. & Range Exp. Sta., Flagstaff, Ariz.) CONTROLLED BURNING IN SOUTHWESTERN PONDEROSA PINE: RESULTS FROM THE BLUE MOUNTAIN PLOTS, FORT APACHE INDIAN RESERVATION. J. For. 56(5): 323-327. May 1958.

Meyer, Arthur B., and F. H. Eyre, editors. FORESTRY TERMINOLOGY / A GLOSSARY OF TECHNICAL TERMS USED IN FORESTRY. 3d edition. Soc. Am. For., Mills Bldg., Wash. 6, D. C. v + 97 p. Revised 1958. $3.50, cloth.
A useful dictionary of thousands of terms that are not satisfactorily defined in ordinary dictionaries. Wildlife men who are working with foresters or forestry literature should find it valuable. Numerous terms from soil science and range management are included, as well as some from wildlife management. Definitions are clear and simple and are reasonably well cross-referenced. The book is well printed and well bound.

Moyle, John B., and Sidney Rommel. (Minn. Dept. Cons.) RESEARCH FOR FIRE CONTROL. Cons. Volunteer 21(122): 34-42. Mar.-Apr. 1958.
Pros and cons of use of controlled burns for wildlife and forestry purposes in Minn. Chief conclusion is that too little is still known of effects for burning to be used commonly. Burns have their drawbacks and should be used cautiously and experimentally.

Paulsell, L. K. EFFECTS OF BURNING ON OZARK HARDWOOD TIMBERLANDS. U. Mo. Agr. Exp. Sta. (Columbia), Res. Bul. no. 640. 24 p., illus. 1957. [From J. For. 56(6).]

Schroeder, M. J., and C. M. Countryman. FIRE-WEATHER SURVEY CAN AID PRESCRIBED BURNING. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), Tech. Pap. no. 21. 10 p. 1957. [From J. For. 56(7).]

Sluder, Earl R. MOUNTAIN FARM WOODLAND GRAZING DOESN'T PAY. US For. Serv., SE. For. Exp. Sta. (Asheville, N. C.), Res. Notes no. 119. 2 p., 1 graph. May 1958.
Research data prove that "Using mountain farm woodland in the Southern Appalachians for pasture will damage soil, destroy young tree seedlings, and lower growth rates of timber. Furthermore, cattle on woodland pasture gain weight slowly or may even lose weight."

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Frankenburger, R. S., and L. W. Oysel. (Clearfield, Pa., and Mich. State U., E. Lansing.) COMMENTS ON "EFFECTS OF SILVICULTURAL PRACTICES ON WILDLIFE FOOD AND COVER IN OAK AND ASPEN TYPES IN NORTHERN MICHIGAN." J. For. 56(6): 433. June 1958.

Hoover, Kenneth B. (Messiah Coll., Grantham, Pa.) CURRENT STUDIES ON THE GENUS CRATAEGUS IN PENNSYLVANIA. Pa. Acad. Sci. 31: 56-61. 1957.
Fruit production was determined for many individual trees in 1955 and 1956. Production was rated in 6 categories ranging from "none" to "excellent." The latter was defined as nearly 100% of potential. Many more trees had poor crops or no crops in 1956 than in 1955. A series of killing frosts in late May of

1956 probably was responsible. While many trees had poor crops in 1956 and some had better crops, the greater number of trees changed but little in yield. This tends to disprove the idea that a tree that fruits heavily 1 year will not do so the next. Crowded or shaded trees produced poorly and bore fruit only on tops or uncrowded side.

Lay, Daniel W. (Texas Game Comm., Buna.) PINES: PROFITS WITH PROBLEMS. Texas Game & Fish 16(4): 5-6, 27, 5 photos. Apr. 1958.

Removal of hardwoods to favor pines may be sound commercial forestry, but it does increase the possibility of soil deterioration and insect attack. Furthermore, hardwoods may sell for more in the future as supplies dwindle. Removal of hardwoods is very hard on wildlife--and many Texas hunting leases bring a dollar an acre per year. Pine growers should consider seriously how many hardwoods it is wise to kill. The more left, the better for game, but one can have good pine and some game too. It is important to have a wide variety of kinds of oaks and other mast plants. Each kind has its own value to game. Together, they provide buffer foods to protect young pines from game damage. Burning has value to both game and pine production, but small, staggered fires are better than large ones. Fire in spring and summer gives nutritional benefits in winter, when most needed. Aerially distributed herbicides kill or damage nearly all plants except pines and grasses. Untreated strips totaling at least 10% of area should be left, especially along streams. When individual hardwoods are killed, several rules may be followed: 1. Spare any hardwood that doesn't over-top a pine. 2. Spare hardwoods of kinds that are uncommon, i.e., less than 3 per acre. 3. Save some of all kinds of oaks. Save the trees that will form merchantable trunks. 4. Leave all vines that aren't harming quality pine. 5. Leave hardwoods well distributed through stand. 6. Leave trees that have squirrel dens in upper trunk or limbs.

McGregor, R. C. SMALL MAMMAL STUDIES ON A SOUTHEAST ALASKA CUTOVER AREA. US For. Serv., Alaska For. Res. Center (Juneau), Sta. Pap. no. 8. 1-9 p., 3 photos. Jan. 1958.

A limited amount of live trapping was done on cutover stream bottom and slope areas on the Maybeso Exp. For. in 1956. In 850 trap-nights, 147 small mammals were caught. Of 124 Peromyscus maniculatus, there was a total of 44 recaptures. Twenty three per cent of white-footed mice died in traps. Peromyscus populations were estimated, by an unstated method, to av: 1.2 to 4.0 per acre with high of 6. Populations were higher in stream bottom than on slope. Shrews were more often caught on slopes, Microtus mainly in grassy areas. 1080-poisoned grain was broadcast over study areas and 10-chain-wide buffer strip. Populations were reduced nearly to 0, but recovered to a large extent within 14 weeks. This type of control is not considered satisfactory for reseeding of cutovers. "The well-established principle of applying poison to the seed itself should be tested under Southeast Alaska conditions."

Miller, Howard A. (US For. Serv., Peachtree 7th Bldg., Atlanta, Ga.) HARDWOOD MANAGEMENT FOR GAME. La. Cons. 10(3): 2-3, 24, 2 photos. Mar. 1958.

General discussion of subject, with emphasis on SE. Hardwoods occupy more than half the commercial forest acreage of the South, but most of the stands are now in poor condition. Forest management is needed. Aim is to upgrade stands so that large trees can be cut selectively on rotation. This system favors wildlife in the long run by providing plenty of healthy seed-producing trees and an uneven-aged forest in which understory plants are periodically rejuvenated. The short-term effects on game may be unfavorable. Various things can be done to benefit game of hardwood forests: food plots, exclusion of hogs, regulation of grazing, release of good food-producing trees, provision of water where needed, use of green-tree reservoirs for waterfowl. The real threat to wildlife of bottomland forests is not stand improvement but the rapid destruction of habitat by agriculture and by impoundments constructed for flood control and power.

Miller, Howard A. (US For. Serv., Peachtree 7th Bldg., Atlanta, Ga.) OPPORTUNITIES IN WILDLIFE. La. Cons. 10(5/6): 4-7, 2 photos. May-June 1958.
Brief article on relation of wildlife to management of southern forests. One section discusses each major forest type, telling what wildlife value each has and what silvicultural measures favor game. Another section takes up major kinds of game animals and tells what forest management methods benefit them. A table at the end lists 46 kinds of plants and indicates what parts of them are used by which game animals.

Shorten, Monica. DAMAGE CAUSED BY SQUIRRELS IN FORESTRY COMMISSION AREAS, 1954-6. Forestry 30(2): 151-172. 1957. [From Biol. Abs. 32(4).]
Examines replies received from foresters to questionnaires on damage caused by the squirrels, Sciurus carolinensis and S. vulgaris, during forest years 1954-6. The most serious economic damage done by both squirrels is considered to be stripping of bark from the stems of growing trees and it is this damage which is examined. The information received is sifted critically and the results summarized in thirteen tables and in two diagrams.--From auth. summ.

STRIPPED LAND & MISCELLANEOUS HABITATS

Lowry, Gerald L. (Ohio Agr. Exp. Sta., Wooster.) CONIFER GROWTH AND SURVIVAL VARIES ON ACID SPOILS. Ohio Farm & Home Res. 43(311): 20-21, graph. Mar.-Apr. 1958.
Report on success of various conifers planted 2 years before on coal strip-mine spoils of different textures and pH in Ohio. "In considering the overall performance...one must take into account both survival and growth. On the strongly acid and toxic spoils, pitch pine was consistently best, followed by jack pine, white pine, ponderosa pine, and shortleaf pine in that order. On the mildly acid Harrison County area white cedar was best, with red cedar, ponderosa pine, jack pine, and shortleaf pine following. Red pine was used in only one area so that comparison of this species can't be made."

CONTROL OF UPLAND VEGETATION WITH HERBICIDES ETC.

Bramble, W. C. (Pa. State U., U. Park.) RECENT ADVANCES IN WOODY BRUSH CONTROL ON RIGHTS-OF-WAY. 33d Natl. Shade Tree Conf. Proc.: 180-185. 1957.
This short paper has 3 sections. First section tells just what is meant by Broadcast Foliage Spray, Stem-foliage Spray, Semi-basal Spray, and Basal Spray. It then tells what effects can be expected of each of these treatments, and what chemicals and volumes of spray are involved. Second section outlines technics that are preferred for different brush conditions. Third section describes a planning and record keeping system that may be used for large-scale right-of-way maintenance.

Bramble, W. C., W. R. Byrnes, and R. J. Hutnik. (Pa. State U., U. Park.) EFFECTS OF CHEMICAL BRUSH CONTROL UPON GAME FOOD AND COVER. Pa. State U., Agr. Exp. Sta. (U. Park), Prog. Rep. 188. 7 1-7 p., 6 photos, 1 graph. May 1958.
"A 5-year study of the development of low plant cover and game usage on a transmission line right-of-way in central Pennsylvania has been made following 5 chemical brush control techniques. The woody brush was first brought under control by use of adequate spray volumes and thorough coverage. A top kill of 94.1 per cent or higher was obtained. This was followed by a resurge of 26 to 42 woody plants over 3 feet in height per acre 5 years after spraying, sassafras excepted. When sassafras was included, the number of woody plants per acre over 3 feet increased to 1,224 for winter basal and to 158 for summer basal sprays. All techniques gave adequate control except for sassafras in the case of winter basal. Considerable disturbances of plant cover, both in amount and kind, followed broadcast and semi-basal techniques. Fireweed became prominent for several years after which the plant community developed toward its original composition. Blueberry which was practically eliminated by broadcast sprays remained sparse. The selective basal techniques maintained the original plant community as a low cover. Common game species used all spray areas the first year following spraying and have either increased their use or maintained it for five years. The development of edges and type interspersion through cutting of the right-of-way and elimination of woody brush on it has favored such species as turkey and rabbits. Deer use the sprayed areas heavily in the spring and summer while grouse appear to prefer the wooded edges."--Authors' summary.

Bramble, W. C., W. R. Byrnes, D. P. Worley, and R. J. Hutnik. (Pa. State U., U. Park.) VARIATION IN DEVELOPMENT OF LOW PLANT COVER FOLLOWING CHEMICAL BRUSH CONTROL. Proc. Soc. Am. For., 1957: 67-71, 1 graph, 3 photos. 1958?

Summary: "A study of the comparative effects of common commercial spray techniques on the plant cover of a right-of-way has been made in central Pennsylvania in an upland mixed oak forest. Thorough applications were made in order to get a maximum kill of brush; and, owing to this, highly satisfactory top kills ranging from 94.1 percent to 99.7 percent were obtained. When sassafras was excluded, adequate control of resurge was obtained with all techniques; five years after spraying the resurge in plants over 3 feet in height varied from 26 plants per acre in the semi-basal to 42 plants in the winter basal. When sassafras was included, the broadcast and semi-basal sprays gave results superior to selective basals. A follow-up summer basal applied the year after the original sprays gave excellent control of brush; the resurge varied from only 2 to 26 plants per acre. There was a marked difference in the reaction of the ground layer following broadcast spraying as compared to selective basal spraying, the former reducing the cover to about 10 percent of the total ground area. Broadcast spray areas slowly recovered over the five-year period, while the basal sprays maintained a tight cover owing to the kill being restricted to the area surrounding sprayed brush. Notable changes in the ground layer that followed broadcast spraying were the appearance of fireweed and the practical elimination of blueberries. With selective basal sprays, the original plant community, composed of bracken, sedge, mixed herbs and blueberries as dominant plants, was maintained on the area. This tight cover has held back the development of seedlings, sprouts, and suckers for at least five years so that resurge over 3 feet in height has been held to a minimum."

Davis, James R. (US For. Serv., Austin State Coll., Nacogdoches, Texas.) BASAL SPRAY WITH 2,4,5-T FOR WINTER HARDWOOD CONTROL IN EAST TEXAS. J. For. 56 (5): 349. May 1958.

In applications made during dormant season, 2,4,5-T was more effective as basal spray than were simple cutting or cutting plus painting stumps with 2,4,5-T.

Egler, Frank E. (Aton For., Norfolk, Conn.) SCIENCE, INDUSTRY, AND THE ABUSE OF RIGHTS OF WAY. Science 127(3298): 573-580, 4 photos. Mar. 14, 1958.

A long and convincing paper on the reasons for which "brush control" on rights of way is almost universally done in harmful and uneconomical ways. Ignorance, habit, and vested interests combine to make progress slow. If qualified botanists were consulted, rights of way could be maintained more cheaply in the long run and would provide better wildlife habitat of low fire hazard. Blanket spraying, now commonly used, has many drawbacks even to the operating companies. No one treatment is the whole answer; treatments must be adapted to the site and the vegetation.

Huffaker, C. B. (Agric. Exp. Sta., Berkeley, Calif.) FUNDAMENTALS OF BIOLOGICAL CONTROL OF WEEDS. Hilgardia 27(3): 101-157, illus. 1957. [From Biol. Abs. 32(4).]

Good author's summary in Biol. Abs.

McConkey, T. W. HELICOPTER SPRAYING WITH 2,4,5-T TO RELEASE YOUNG WHITE PINES. NE. For. Exp. Sta., Upper Darby, Pa., Sta. Pap. no. 101. 14 p., illus. 1958. [From J. For. 56(5).]

McQuilkin, W. E. FRILL TREATMENT WITH 2,4,5-T AND 2,4-D EFFECTIVE FOR KILLING NORTHERN HARDWOODS. NE. For. Exp. Sta., Upper Darby, Pa., Sta. Pap. no. 97. 18 p. 1957. [From J. For. 56(5).]

Richter, Wilmer C. (Pa. Game Comm.) WILDLIFE FOOD AND COVER BY THE MILE. Pa. Game News 29(5): 43-44, 2 photos. May 1958.

Comparisons were made of production (presumably of fruits) by shrubs on edges of pipe line and power line rights-of-way and in adjacent woodlands. Figures were based on ratio of actual to potential production. Flowering dogwood produced 41% on edges of rights-of-way as compared to 15% in adjacent forest. Similar figures for other shrubs were: juneberry 12% vs. 4%; witch hazel 35% vs. 4%; hawthorn 33% vs. 4%; scrub oak 14% vs. 3%; and sassafras 34% vs. 11%. "...release of the shrubs from the shading effect of overshadowing growth is a must, if maximum production is to be obtained."

Rushmore, Francis M. (NE. For. Exp. Sta., Upper Darby, Pa.) SODIUM ARSENITE IN SPACED AX CUTS: AN EFFECTIVE STAND-IMPROVEMENT TECHNIQUE. J. For. 56(3): 195-200, 1 graph. Mar. 1958.

Yocom, Herbert A. (S. For. Exp. Sta., New Orleans 13, La.) DEEP GIRDLES GIVE QUICKEST CROWN KILL OF OAKS. J. For. 56(3): 217, 3 photos. Mar. 1958.

MAMMALS--GENERAL

Hennig, Rolf. DISPLACEMENT ACTIVITIES OF OUR GAME MAMMALS. Z. Jagdwissensch. 3(1): 28-32. 1957.
In German. Descriptions of displacement feeding in Eur. hares and roe deer and displacement grooming in roe deer.--Vagn F. Flyger.

Patterson, Bryan. (Harvard U., Cambridge, Mass.) MAMMALIAN PHYLOGENY. In PREMIER SYMPOSIUM SUR LA SPÉCIFICITÉ PARASITAIRE DES PARASITES DE VERTÉBRÉS. Union Internatl. Sci. Biol. Ser. B. 32: 15-49, maps. 1957. [From Biol. Abs. 32(5).]
This paper covers discussion of the origin of mammals, Mesozoic mammals, major divisions of Eutheria, and phylogeny of surviving mammalian groups, taken up order by order, systematically. For each order, there is discussion of parasites found. Geographic distribution of mammals is discussed, with maps showing the groups present on each continent at various geological times. In concluding, author states that when he began the study, he entertained somewhat higher hopes concerning possible value of host-parasite relations as clues to taxonomy and phylogeny of hosts than he now holds. Areas of both agreement and disagreement occur, but the main note is one of uncertainty.

Petter, J. J., and A. Petter-Rousseaux. THE LEMURS OF MADAGASCAR AND THEIR PROTECTION. La Terre et la Vie 105(1): 45-68, 2 pl. Jan.-Mar. 1958.
In French.

Saint Girons, Marie-Charlotte. LES FACTURES ÉCOLOGIQUES DU CYCLE JOURNALIER D'ACTIVITÉ CHEZ QUELQUES PETITS MAMMIFÈRES FRANCAIS. Mammalia (Paris) 21(3): 197-209. Sept. 1957. [From J. Mamm. 39(2).]

Thorne, Oakleigh, II. (Thorne Ecol. Res. Sta., Boulder, Colo.) A LOW-COST LABORATORY MOUSE CAGE DRINKING FOUNTAIN. Thorne Ecol. Res. Sta., Bul. 5: 1-4. 1958.
Describes in detail the construction of a low-cost glass drinking fountain that is easy to clean, allows a minimum of evaporation, and can be made with ordinary and micro bunsen burners, using soft glass.--Author.

Young, J. Z. (U. Coll., London, Eng.) THE LIFE OF MAMMALS. Oxford U. Press, N. Y. xv + 820 p., 338 figs. 1957.
Not a natural history book, but a detailed text on anatomy, physiology, histology, and embryology. Modern topics such as information theory and control of differentiation are introduced insofar as possible.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

Anon. PRESENT STATUS OF THE MICROTUS OUTBREAK IN CALIFORNIA. Calif. Vector Views 5(7): 47. July 1958.
M. montanus populations generally continued to decline through spring. Voles are nearly or entirely absent from many fields. The decline has proceeded in unpoisoned as well as poisoned fields. There is no evidence that disease has been a factor recently. The decline may be attributed to population stress causing reproductive failure. Populations are recovering in some fields. The decline has been less in certain natural habitats where the peak was lower. Tests for tularemia have been negative since early in 1958.

Barbehenn, Kyle R. SPATIAL AND POPULATION RELATIONSHIPS BETWEEN MICROTUS AND BLARINA. Ecology 39(2): 293-304, 3 graphs. Apr. 1958.

Lines of snap traps were run in 11 fields near Ithaca, N. Y. and 200 bait stations were maintained in a 12-acre field. In the latter, records were kept of scats; also, the area was live-trapped and later snap-trapped. Blarina populations in open fields had drastic annual turn-over and high winter mortality. Microtus populations appeared to fluctuate independently of Blarina populations. Microtus populations of different fields often were not in phase with each other. Some drops in Microtus populations could not be attributed to shrew predation. Certain areas were avoided by Blarina, and were avoided by Sorex and Microtus except at certain seasons, depending on moisture and vegetation. Associations between Microtus and Blarina were either positive or negative, varying with habitat preferences and habitat changes. An effect of Blarina on distribution and activity of Microtus occurred at 8 stations that may have been near shrew dens. Survival of fall young of Microtus was unusually low in 1 area; this may have represented shrew predation on vole nests. The general conclusion reached is that effect of Blarina on Microtus populations depends on local and temporary conditions. "Presumably, the shrews are capable of either precipitating a decline or prolonging a normal microtine cycle."

Calhoun, John B., and Andrew A. Arata, editors. ANNUAL REPORT--NORTH AMERICAN CENSUS OF SMALL MAMMALS. POPULATION DYNAMICS OF VERTEBRATES / COMPILATIONS OF RESEARCH DATA. Release no. 6, for 1952, ii + 155 p., Aug. 1957. Release no. 7, for 1953, ii + 167 p., Sept. 1957. Release no. 8, for 1954, ii + 96 p., Oct. 1957. Release no. 9, for 1955 and 1956 and "Certain Summaries for the Years 1948 through 1956," ii + 132 p., 2 figs., Nov. 1957. Admin. Publ., US Dept. Health, Ed., & Welfare, Natl. Inst. Mental Health, Bethesda 14, Md. [Not available for general distribution.]

"These compilations of research data are an administrative publication of the National Institute of Mental Health, and are not intended for listing in publication catalogs as available for general distribution upon request. They are prepared in small quantity for the information and use of active or potential cooperators." The papers consist of many detailed reports of kill-trap catches made by cooperators, as well as certain summary tables for a year or span of years. There are also brief discussions of the purposes and uses of the data presented.

Chitty, Dennis. (Bur. Animal Pop., Oxford U., Eng.) SELF-REGULATION OF NUMBERS THROUGH CHANGES IN VIABILITY. In Cold Spring Harbor Symposia on Quant. Biol. 22: 277-280. 1958.

Summary: "1. Recurrent declines in the numbers of the vole, Microtus agrestis, seem to be associated with a pathological condition, which has yet to be diagnosed. 2. Gross splenic hypertrophy occurs in dense breeding populations in the wild and is thought to be a symptom of the condition postulated. 3. Splenic hypertrophy has recently become common in two species (M. agrestis and M. orcadensis) maintained under standard conditions in the laboratory. No instances were observed in earlier years when stocks were recruited from pairs bred in isolation for many generations. Recent procedures differ, so far as is known, in one respect only, that is, that isolated pairs now include the descendants of animals which had been breeding under conditions of mutual strife. 4. A form of hemolytic anemia, apparently caused by an hereditary factor, is associated with splenic hypertrophy. 5. It seems necessary to explain the occurrence of an abnormal condition of this sort by assuming that it is caused by a factor which also confers an advantage under some circumstances. It may be that mutual strife, both in the wild and in the laboratory, favours the spread of the factor causing hemolytic anemia; that under most other circumstances normal animals are at an advantage."

Christian, John J. (Naval Med. Res. Inst., Bethesda 14, Md.) A REVIEW OF THE ENDOCRINE RESPONSES IN RATS AND MICE TO INCREASING POPULATION SIZE INCLUDING DELAYED EFFECTS ON OFFSPRING. Naval Med. Res. Inst., Lecture and Rev. Ser. no. 57-2. p. 443-462, 6 figs. Aug. 1957. [To appear in A.A.A.S. Symposium on Res. of Sociological Signif.]

A lucid and informative picture of the development of ideas concerning control of animal numbers and a review of theory and experiment bearing on the role of stress in population control. A scheme is postulated for the regulation of

mammalian populations. It is believed to account for all field observations. In a growing population of low density, the reproductive rate is high, with fertility, fecundity, and lactation at maximum rates. Mortality is at relatively low levels, resistance to disease is high, age composition is shifted to the younger side, and infant survival is good. As the population grows, social pressures increase, producing stress. The pituitary-adrenocortical system is activated via the higher central nervous system, hypothalamo-hypophyseal system, and the anterior pituitary. In turn there is a related increase in adrenocorticotrophin and a reduction in gonadotrophins and growth hormone. The overall result is a decrease in reproduction and an increase in mortality; population growth slows. "This is a sort of feed-back mechanism in which the level of stress serves as the governor regulating population growth." The population grows more slowly until a level of maximal stress is reached, when growth ceases. Additional environmental hardship or an overshot of population growth may cause a sudden decline; otherwise the decline is slow. Prolonged effects of stress on the surviving young permits only slow and gradual recovery.--L. F. Stickel.

Christian, John J., and David E. Davis. (Naval Med. Res. Inst., Bethesda 14, Md.) THE BIOLOGICAL BASIS OF RODENT CONTROL. Naval Med. Res. Inst., Lecture and Rev. Ser. no. 57-3. p. 463-472, 3 figs. Nov. 1957. [Presented at Proc. 9th Pac. Sci. Congress, Bangkok, 1957.]

Trapping, poisoning, and disease are at best only temporary expedients in controlling rodent populations. In fact, control programs (unless continuous and intensive) usually result in increased reproductive rate and a rapid return to or above the original level. The only effective control must curtail reproduction and/or infant survival. Experimental evidence from laboratory and field is summarized to show that this can be done only by increasing competition and its attendant stress phenomena. Sanitation is cited as a successful method of increasing stress through reduction of food supply. An experiment involving introduction of alien rats into a population is cited as suggestive of other methods, whose discovery and application are needed. 35 references.--L. F. Stickel.

Christian, John J., and Cobert D. Lemunyan. (Naval Med. Res. Inst., Bethesda 14, Md.) ADVERSE EFFECTS OF CROWDING ON REPRODUCTION AND LACTATION OF MICE AND TWO GENERATIONS OF THEIR PROGENY. Naval Med. Res. Inst., Res. Rep. vol. 15: 925-936, 2 figs. Dec. 1957. [Submitted for publ. in Endocrinology.]

Seven sets of 20 pairs of mice were placed in crowded cage conditions for 6 weeks, then isolated by pairs. No young were born in the crowded quarters and no ♀ appeared pregnant. 66 pairs had litters after isolation. Birth weights of these litters were no different from those of controls. Half-litters were exchanged with control mothers. Young nursed by crowded females in litters of 6 or more were weaned at a 17% lower weight than those nursed by controls. A continuation of the experiment into the next generation showed similar results. The effect was concluded to be a result of a quantitative and/or qualitative suppression of lactation as part of the response to stress produced by crowding. "Such attenuation of the effects of crowding may explain the continued decline in natural populations following a precipitous crash in numbers." A further experiment was made in which mice were sacrificed after crowding. In these the number of implantations per mouse and number of young per litter were significantly less than in controls.--L. F. Stickel.

Davis, David E., and John J. Christian. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) POPULATION CONSEQUENCES OF A SUSTAINED YIELD PROGRAM FOR NORWAY RATS. Ecology 39(2): 217-222, 3 graphs. Apr. 1958.

Summary: "To enlarge our understanding of population mechanisms a program of sustained yield was conducted on Norway Rats (Rattus norvegicus) in three blocks in Baltimore. From the history of the increase in the rat population, the inflection point of a logistic was calculated. The populations were then reduced to their inflection points and kept there from April to August or October. During this time it was necessary to remove about 1.5 times as many rats as predicted from the rate of increase at the inflection point. Removal of rats was ended in one block in August and the population returned to a high level. The populations in the other blocks collapsed in October. During all this time the percentage pregnant was normal for increasing populations. Presumably the

collapse of the populations resulted from a decline in average age of females till they were too young to breed so that while the percentage of sexually mature females breeding remained high, the number of mature females dropped drastically. A second part describes the procedure used here in fitting the data to a logistic curve."

Emlen, John T., Jr., Howard Young, and Robert L. Strecker. (U. Wis., Madison.) DEMOGRAPHIC RESPONSES OF TWO HOUSE MOUSE POPULATIONS TO MODERATE SUPPRESSION MEASURES WITH 1080 RODENTICIDE. Ecology 39(2): 200-206, 3 graphs. Apr. 1958.

Two natural indoor populations of Mus were partially exposed to scattered 1080 stations. Data were obtained on population size, mortality rate, life expectancy, population composition, breeding activity, movements, and susceptibility to poison. Population A was exposed to poison for first 4 months, not for second 4. Population B was exposed to poison only in second 4 months. A modified Peterson index did not give useful data on population changes, for its requirements were not met. Monthly mortality rates dropped by about half when population A was no longer exposed to poison. They nearly doubled when population B was exposed. "The population response to poison introduction was essentially the reciprocal of that to poison removal. Mortality and life expectancy were disturbed while the population was declining following poison introduction and then tended to recover as the population stabilized. Following poison removal, mortality and life expectancy were again disturbed during the period of population readjustment, but the indicated trends were confusing and the relationships obscure. Most of the data suggest that the observed overall reduction under poison exposure was effected and maintained by a heavy reduction in the areas closely surrounding the poison stations, and that the animals inhabiting the broad intervening spaces were largely unaffected."

Harrison, John L. (Inst. Med. Res., Kuala Lumpur, Malaya.) RANGE OF MOVEMENT OF SOME MALAYAN RATS. J. Mamm. 39(2): 190-206, 9 figs. May 1958.

Range of movement is estimated for 7 species of Rattus. The method devised for calculating and expressing range data is the principal subject of the paper. Raw data were obtained from recaptures of marked rats. Trap sites were on a grid pattern but the trapping differed from the usual grid-trapping in that only 1 or 2 lines of traps were set at 1 time. Details of the method will be understood only by statistically trained persons. Fundamentally it involves statistical treatment of distances from individual capture sites to their geometrical centers of activity. As Dice and Clark (1953. Contrib. Lab. Vert. Biol. no. 62) started with these same data to develop a statistical expression of range, it is regrettable that their paper was not discussed. Harrison's treatment is based on a mechanistic concept of range that assumes that there are no limits to the range of an animal, but instead, decreasing zones of probability of capture (use) about a center.--L. F. Stickel.

Hays, Horace A. (Kans. State Teach. Coll., Pittsburg.) THE DISTRIBUTION AND MOVEMENT OF SMALL MAMMALS IN CENTRAL OKLAHOMA. J. Mamm. 39(2): 235-244, 3 figs. May 1958.

Summary: "(1) During a one-year study in McClain County, Oklahoma, a total of 233 mammals were collected and catalogued; of these, 184 (79 per cent) were taken from the open grassland and 49 (21 per cent) were taken from the wooded ravine. (2) A greater number of small mammals were found to inhabit the open grassland than the wooded ravine. (3) From the standpoint of numbers collected, Peromyscus maniculatus, Perognathus hispidus and Sigmodon hispidus were the most abundant small mammals in the open grassland; in the ravine, Peromyscus leucopus and Neotoma floridana were the most abundant. (4) For determining the most abundant species in the two vegetative types, two methods of trapping, live trapping and snap trapping, were found to be comparable. Approximately three times as many small mammals were taken in the grassland as in the ravine by each method of trapping. (5) Although some mammals moved freely from one vegetative type to the other, most were restricted to only one vegetative type and were seldom found outside their native habitat. (6) More males than females were captured in the live traps; however, the total movement for males and females, as shown by the live-trap record, was approximately the same. (7) The number of small mammals captured in traps varied with the seasons of the year."

Hoffmann, Robert S. (Mont. State U., Missoula.) THE ROLE OF REPRODUCTION AND MORTALITY IN POPULATION FLUCTUATIONS OF VOLES (MICROTUS). Ecol. Monog. 28 (1): 79-109, 7 figs. Jan. 1958.

Calif. populations of M. montanus and M. californicus were studied by systematic snap-trapping and autopsy, 1952-55. Both reached peaks of density and declined again in this period. For both species the natality rate (measured by ovulation rate and litter size) was related inversely to population density. Age at maturity and post-partum breeding were constant and independent of population cycle. Duration of breeding season was constant in M. montanus. In M. californicus, length of breeding season varied from year to year but apparently was not of prime importance to population cycle. Changes in population density are therefore believed to be the result of variations in mortality rather than natality. Spring populations were not greatly different from year to year except after the decline. Fall density depended on survival of individuals born during the breeding season. Explanation of heavy mortality that ended peak of the population cycle is uncertain. Results were not fully in line with what would be expected from the theory of stress relationships: according to this theory the crash should have occurred in late winter or early spring; actually it occurred in midsummer in M. montanus. Furthermore, greatest mortality was suffered by juvenile descendants of overwintering adults rather than by adults. Breeding patterns of the 2 species were somewhat different. M. californicus had long breeding season, moderate litter size, and precocious breeding was rare; litter size was low at first, rose to a peak in the middle of the breeding season, then declined. M. montanus had a short breeding season, large litters, and precocious breeding was common; litter size was largest at the beginning of the season and declined progressively. Trends of litter size correlated with protein content of grasses available in the habitats of the species.--L. F. Stickel.

LoBue, Joseph P., and Rezneat M. Darnell. (Marquette U., Milwaukee 3, Wis.) AN IMPROVED LIVE TRAP FOR SMALL MAMMALS. J. Mamm. 39(2): 286-290, 1 fig. May 1958.

Describes double-door, multiple-catch trap made of redwood and reports its advantages and disadvantages.

Migulin, A. A. FACTORS OF CHANGE IN MICROTINAE POPULATIONS LIVING IN FIELDS IN THE UKRAINIAN SOVIET SOCIALIST REPUBLIC. Zool. Zhur. 34(6): 1389-1403. 1955. [From Biol. Abs. 32(3), from Referat. Zhur., Biol., 1956, No. 63921.]

In Russian. A survey of the Microtinae from 1891 to 1954 is covered. Large-scale reproduction in the forest-steppe and steppe of the Ukrainian SSR of murine rodents took place in years with a large amount of precipitation in spring and summer. Early frost in November or December, especially in the absence of snow cover, causes catastrophic extermination of Microtinae. An even winter with much snow and without thaws is favorable for their hibernation; then in the next year, large-scale reproduction is possible. Forecasts of the dynamics of Microtinae populations must be based on the dependence of their reproductiveness on the weather conditions of that year. Predators restrain the growth of the populations of murine rodents in years with average weather. In years which are optimal for reproduction, predators play a considerably less important role. Effective agricultural engineering and the contemporary mechanization of tilling the soil and harvesting the crops are the principal prophylactic measures for reducing Microtinae populations on the fields in years with average weather conditions. But in years in which weather conditions are optimal for murine rodents, the part played by agricultural engineering is noticeably less important; even with its help it is uncertain whether restraint of large-scale reproduction of Microtinae is possible. In this case chemical warfare is necessary. The role of epidemiological diseases as a cause of the catastrophic dying-off of Microtinae in years of large-scale reproduction is not explained. Dying-off of the population always begins with the frost at the changeover from fall to winter weather, never earlier; the principal causes of death of Microtinae in the fields are unfavorable weather factors and insufficient food.

Pitelka, Frank A. (MVZ, U. Calif., Berkeley.) SOME ASPECTS OF POPULATION STRUCTURE IN THE SHORT-TERM CYCLE OF THE BROWN LEMMING IN NORTHERN ALASKA. In Cold Spring Harbor Symposia on Quant. Biol. 22: 237-251, 12 figs. 1958.

Results of a study of numbers and breeding of the lemming in Alaska in the summer of 1952 are incorporated with a general review of cyclic population changes in the Arctic. Lemmings were common when the snow melted in the summer of 1952 for they had bred successfully during the preceding winter when vegetation and snow cover were heavy. Numbers fell rapidly when snow melted, primarily because the lemmings were eaten by jaegers. The proportion of ♂♂ declined also, because more ♂♂ were caught by predators. Lemmings gained weight rapidly after melting snow made food available: weights of ♀♀ increased 30% in 9 days, ♂♂ 35%. Breeding began in mid-June to produce young in July. Reproductive rate declined toward the end of the summer, increased a little in the fall when some of the young females bred, declined again before the period of winter breeding.--L. F. Stickel.

Sealander, John A., and Douglas James. (U. Ark., Fayetteville.) RELATIVE EFFICIENCY OF DIFFERENT SMALL MAMMAL TRAPS. J. Mamm. 39(2): 215-223. May 1958.

"It was shown that snap traps were relatively inefficient as compared with live traps and about equally as efficient as water or 'pit' traps, and that the Sherman trap gave an over-all better performance than the Young trap. The Wisconsin trap did not enter directly into any comparisons but was found inferior for general field use in preliminary experiments. Other types of mammal traps used chiefly to procure medium-sized mammals were compared briefly but no definite conclusions were drawn as to their relative efficiency."

Wetzel, Ralph M. (U. Conn., Storrs.) MAMMALIAN SUCCESSION ON MIDWESTERN FLOODPLAINS. Ecology 39(2): 262-271, 8 figs. Apr. 1958.

Mammal populations, principally of small mammals, were studied for 15 years on a series of floodplain sites ranging from new stripmine to old stripmine, mature forest, and climax forest. Peromyscus m. bairdi invaded early and built up good populations. These dropped as P. leucopus, Microtus ochrogaster, and Blarina came in with denser, taller types of vegetation. The total small mammal population declined as the forest-edge stage was reached. Grassland animals such as Microtus, Zapus, and Synaptomys decreased as forest conditions developed. P. leucopus numbers built up slowly and did not compensate for decrease in grassland forms. P. leucopus did become numerous, however, in mature and climax forest--so much so that it made the small mammal population of old forest higher than that of any earlier stage. Favorable aspects of mature forests for mammals are pointed out. The paper also comments on various species of mammals not mentioned here.

MAMMALS--PARASITES AND DISEASES

Anon. RABIES IN BATS, MOLES, AND CATTLE. J. Am. Vet. Med. Assn. 132(11): 469. June 1, 1958.

"An atypical form of rabies, characterized by excessive docility, occurs in cattle in northeastern Yugoslavia. Rabies virus has been found, locally, in the brains of 4 insectivorous bats (Nyctalus noctula) and in the brains of 2 of 30 moles, but brains of 60 field mice were negative. The moles and bats may acquire the virus from eating the larvae and adults of a burying beetle which lives on carrion. However, the bats may not play a role in the epizootiology of rabies in Europe since the virus is passive and present only in their brains. --Vet. Bull. (Feb., 1958): Item 412." Complete.

Anon. LEPTOSPIROSIS IN OHIO WILDLIFE. J. Am. Vet. Med. Assn. 133(2): 104. July 15, 1958.

"Since mid-1954, 932 blood samples from animals in Ohio have been tested for Leptospira pomona. Reactors were found in seven species but none in 150 rabbits, 37 muskrats, 9 cats, and in ten samples from four other species. Reactions ranging from 1:100 to 1:3,200 were found in 42 (19%) of 224 deer, 16 (23%) of 70 raccoons, 14 (25%) of 55 foxes, 6 (55%) of 11 skunks, and 1 each in 142 mice, 165 rats, and 43 opossums." Complete. Source of data not mentioned.

Galton, Mildred M., Dorothy K. Powers, Sturgis McKeever, and G. W. Gorman. (US Pub. Health Serv., Chamblee, Ga.) IDENTIFICATION OF TWO LEPTOSPIRAL SEROTYPES NEW TO THE UNITED STATES. Pub. Health Rep. 72(5): 431-435. May 1957.
Data on 4 strains from opossums and 2 strains from raccoons.

Hartwell, W. V., S. F. Quan, K. G. Scott, and L. Kartman. (US Pub. Health Serv., San Francisco, Calif.) OBSERVATIONS ON FLEA TRANSFER BETWEEN HOSTS; A MECHANISM IN THE SPREAD OF BUBONIC PLAGUE. Science 127(3302): 814. Apr. 11, 1958.
Radioactivity was used to demonstrate transfer of wild rodent fleas, Malaraeus telchinum, from Microtus californicus to Rattus norvegicus under various experimental field conditions.

Kartman, Leo, Virgil I. Miles, and Frank M. Prince. (US Public Health Serv., San Francisco Field Sta., San Francisco 18, Calif.) ECOLOGICAL STUDIES OF WILD RODENT PLAGUE IN THE SAN FRANCISCO BAY AREA OF CALIFORNIA. I. INTRODUCTION. Am. J. Trop. Med. & Hygiene 7(1): 112-124, 3 figs. Jan. 1958.
Full account of aims, area, and methods is followed by brief sections on mammals and fleas found and on occurrence of plague in the area.

Kartman, L., K. F. Murray, F. M. Prince, S. F. Quan, and M. A. Holmes. (US Public Health Serv., San Francisco Field Sta., San Francisco 18, Calif.) PUBLIC HEALTH IMPLICATIONS OF THE MICROTUS OUTBREAK IN OREGON AND CALIFORNIA DURING 1957-1958. Calif. Vector Views 5(4): 19-24. Apr. 1958.
The Microtus montanus outbreak discussed here is one of the largest Microtus outbreaks ever recorded in N. Am. Authors studied disease conditions in living and dead animals from various areas. Tularemia was common. It killed from 20-35% of Microtus taken alive. Apparently a tularemia epizootic accompanied the Microtus outbreak. It decimated some populations but did not eliminate them. Transmission evidently was mainly through cannibalism. There were almost no fleas on Microtus, and although there were many mites and lice of various kinds, tularemia could be recovered from very few. Plague was found rarely in Microtus. Probably it was carried to them by infected fleas from other kinds of rodents living in non-cultivated areas around the Microtus fields. The tularemia epizootic is of public health significance because diseased voles not only contaminate water, but may be eaten by pet cats and dogs from which people can get the disease. Of 30 water samples from streams and ditches, 23% were positive for tularemia organisms. So was a shallow drinking-water well near which infected voles were found. Infected voles can also contaminate stored grain and other foods and feeds. The tularemia organism can survive for long periods in mud, rodent urine, animal tissues, rodent hair, grain and other foods, especially under low temperatures.

Layne, James N. (U. Fla., Gainesville.) RECORDS OF FLEAS (SIPHONAPTERA) FROM ILLINOIS MAMMALS. Chi. Acad. Sci., Nat. Hist. Misc. no. 162. 1-7 p. Mar. 1958.
"Over 800 fleas of five families and 17 species were collected from approximately 900 mammals of 38 species examined. Of the latter number 19 species were hosts of Siphonaptera." Hosts and localities are listed.

Miles, Virgil I., Alva R. Kinney, and Harold E. Stark. (US Pub. Health Serv., Atlanta, Ga.) FLEA-HOST RELATIONSHIPS OF ASSOCIATED RATTUS AND NATIVE WILD RODENTS IN THE SAN FRANCISCO BAY AREA OF CALIFORNIA, WITH SPECIAL REFERENCE TO PLAGUE. Am. J. Trop. Med. & Hygiene 6(4): 752-760. July 1957.

Morlan, Harvey B., and C. Clayton Hoff. (US Pub. Health Serv., Atlanta, Ga.) NOTES ON SOME ANOPLURA FROM NEW MEXICO AND MEXICO. J. Parasit. 43(3): 347-351. June 1957.
Summary: "From 1948 to 1954, over 3600 lice (Hoplopleuridae) were collected in New Mexico and northern Mexico from 8,784 examinations of 22 rodent species. Observations on the 11 species of Anoplura include: (1) geographic and host distribution; (2) seasonal abundance of females, males, and nymphs; (3) brief notes on morphological variations."

Murray, Keith F. (Calif. Dept. Health, Berkeley.) AN ECOLOGICAL APPRAISAL OF HOST-ECTOPARASITE RELATIONSHIPS IN A ZONE OF EPIZOOTIC PLAGUE IN CENTRAL CALIFORNIA. Am. J. Trop. Med. & Hygiene 6(6): 1068-1086, 1 map. Nov. 1957.

Study was made in several vegetation types in San Bruno Mtns. "Small mammals were most abundant in chaparral and coastal scrub, very few in dense woodland or grazed grassland. There were often high populations in ungrazed grassland with shrub clumps or tall forbs." Abundance and habitat distribution of mammalian species are discussed. Occurrence and distribution of fleas are discussed in detail. After plague was discovered on 1 study area, 500 acres were treated with poison grain. Mammalian populations were reduced 25-80%; Microtus was most affected. Populations regained previous levels in about 2 months. Reithrodontomys increased strikingly. Density of fleas on hosts increased sharply immediately after poisoning. The poisoning operation apparently was ineffective in reducing plague transmission potential among wild rodents. "The role of habitat distribution is emphasized in governing interspecific host and flea contacts, continuity of distribution of host populations and potential for the contact of native mammals with humans and domestic rats."

Smith, Wm. W. (U. Fla., Gainesville.) RAT, FLEA, AND MURINE TYPHUS RECURRENCE FOLLOWING ERADICATION MEASURES. Pub. Health Rep. 73(5): 469-473. May 1958.

Smith, W. W., and G. J. Love. (U. Fla., Gainesville.) ECTOPARASITE POPULATIONS AND PREVALENCE OF MURINE TYPHUS ANTIBODIES IN COTTON RATS OF SOUTHWEST GEORGIA DURING WET AND DRY PERIODS. Trans. Am. Micros. Soc. 77(1): 48-56. Jan. 1958.

Smith, Wm. W., R. W. Menges, and Lucille K. Georg. (U. Fla., Gainesville.) ECOLOGY OF RINGWORM FUNGI ON COMMENSAL RATS FROM RURAL PREMISES IN SOUTHWESTERN GEORGIA. Am. J. Trop. Med. & Hygiene 6(1): 81-85. Jan. 1957.

U. S. Dept. Agr. RABIES IN THE UNITED STATES IN 1957. J. Am. Vet. Med. Assn. 133(2): 105, map. July 15, 1958.

Map shows number of reported cases per state. Total was 5,008, the lowest in 20 years. Fewer cases were reported from dogs and cattle, but more from wild mammals. "The percentage distribution by species in 1957 was: dogs, 38; foxes, 21; skunks, 15; cattle, 13; and cats, 8 per cent. There was a general downward trend in cases in all sections of the United States except the north central states."

SHREWS, MOLES, BATS

Benedict, Frances A. HAIR STRUCTURE AS A GENERIC CHARACTER IN BATS. U. Calif. Publ. Zool. 59(8): 285-548, 9 pl., 4 figs. Oct. 1957. $4.00 from U. Calif. Press, Berkeley.

Hairs of all 16 families and 166 of the 185 genera of bats of the world were studied with the aim of casting light on taxonomy and relationships. Results are tabulated, discussed family by family, and incorporated into a key. All families and most genera are keyed out. The author's comments on techniques and hair structure should be of value to others working with hairs. The author could not examine all species of each genus, and we found no indication of how many specimens of any species were studied. The key should be used with these facts in mind. The paper includes a classification of bats, down to genus, and numerous illustrations.

Benton, Allen H., and Jack Scharoun. (N. Y. State Coll. Teach., Albany.) NOTES ON A BREEDING COLONY OF MYOTIS. J. Mamm. 39(2): 293-295, 1 fig. May 1958.

Study of colony in Schoharie Co., N. Y. Presents data on age ratios, sex ratios, weights, time of birth, lack of size criteria for separating young of year from adults, and parasites.

Crowcroft, Peter. THE LIFE OF THE SHREW. Max Reinhardt, Ltd., London. vi + 166 p. 1957. 15s net. [From review by H. R. Hewer, Nature, Feb. 22, 1958.]

"This is an excellent account of the biology of the species of British shrews, with perhaps more emphasis on the common and pigmy shrews. Their general behaviour, fighting propensities, reproduction, activity rhythm and feeding, their longevity (or should it be brevity?) and their position both as predators and prey are all dealt with. Much is the result of the author's own observations and experiments; but all the previously known facts have been incorporated in a very readable book. The shrew's reputation in folk-lore and in naturalists' accounts, even as late as 1911, is shown to be largely erroneous. The gaps in our knowledge and the methods by which they may be filled are dealt with in a stimulating and attractive manner. There are a good bibliography and index, while the tailpieces by Erik Thorn portray the characteristic postures and behaviour of shrews most admirably."

Davis, Wayne Harry. POPULATION DYNAMICS AND TAXONOMY OF THE BAT PIPISTRELLUS SUBFLAVUS. Ph.D. thesis, U. Ill. 93 p. 1957. [From abstract in Dissertation Abstracts 18(2).]

Winter populations were studied in 2 caves in W. Va. Males comprised 78% and 83% of populations. Sex ratios varied from year to year, probably with weather, and with latitude. Mortality was high in first 2 years, low thereafter. Males over 2 years old survived at rate of 90% a year through 6th year, ♀♀ at rate of 60%. Litter size was 1-4, usually 2. Young were born in late June in W. Va., earlier southward. Preferred habitat contained large trees, water, and open spaces. Pipistrellus subflavus will not occupy same feeding territory as Myotis lucifugus. Epiphyses of fingers were not closed when young entered hibernation in Vt., so young and adults could be separated. This was not true in Fla. and only partly true in Ky. Molt was described. Females av. slightly larger than ♂♂. Color variation was great in any population. Four subspecies, 1 new, were recognized.

Glass, Bryan P. (Okla. A & M Coll., Stillwater.) EFFECTIVENESS OF JAPANESE MIST NETS FOR SECURING BATS IN TEMPERATE LATITUDES. SW. Nat. 1(3): 136-138. 1956. [From Biol. Abs. 32(6).]

Grim, John Norman. (2801 State St., Santa Barbara, Calif.) FEEDING HABITS OF THE SOUTHERN CALIFORNIA MOLE. J. Mamm. 39(2): 265-268, 1 graph. May 1958.

Food consumption and weight changes of captive Scapanus latimanus fed dog food or earthworms.

Grinnell, Alan D., and Donald R. Griffin. (Harvard U., Cambridge, Mass.) THE SENSITIVITY OF ECHOLOCATION IN BATS. Biol. Bull. 114(1): 10-22, 7 figs. Feb. 1958.

Good experimental study of distances at which flying Myotis lucifugus react to presence of small wires of different sizes. "Since small wires can be detected at distances of as much as 5500 times the wire diameter, and well before the bat gives evidence by its flight pattern that it is aware of them, it appears likely that larger objects are detected at considerably greater distances."

Hall, John S., and Wayne H. Davis. (Mus. Nat. Hist., U. Ill., Urbana.) A RECORD OF HOMING IN THE BIG BROWN BAT. J. Mamm. 39(2): 292. May 1958.

Kowalski, Kazimierz, Adam Krzanowski, and R. J. Wojtusiak. REPORT ON BAT-BANDING IN POLAND IN THE YEARS 1939-1953. Polska Akad. Nauk. (Warszawa), Acta Theriologica 1(5): 109-158, 1 fig. 1957.

Polish with 5-p. English summary. 4347 bats of all 17 Polish species were banded. This paper is a detailed report of recoveries. The summary tells what has been learned of the movements of all species for which there were recoveries.

Krutzsch, Philip H., and S. Edward Sulkin. (U. Texas, Dallas.) THE LABORATORY CARE OF THE MEXICAN FREE-TAILED BAT. J. Mamm. 39(2): 262-265, 2 photos. May 1958.

Mueller, H. C., and J. T. Emlen, Jr. (U. Wis., Madison.) HOMING IN BATS. Science 126(3268): 307-308. Aug. 16, 1957.

484 bats from a mine in sw. Wis. were released 5 to 60 mi. to east. Returns during same night varied from 6% in the 60-mi. group to 72% in one of the 5-mi. groups. Blindfolded bats homed as quickly as controls. Results indicate "that bats possess a well-developed ability to orient and to home over long distances by sensory means other than vision. Audition has not been eliminated as a possible mechanism, but it appears to hold little promise of providing a complete answer."

Mumford, Russell E. (Mus. Zool., U. Mich., Ann Arbor.) POPULATION TURNOVER IN WINTERING BATS IN INDIANA. J. Mamm. 38(2): 253-261, 1 fig. May 1958.

Summary: "A wintering cave population of banded Eptesicus fuscus was intensively studied from August, 1954, through April, 1955, near Bedford, Indiana. Although at least 109 individuals utilized the cave, the maximum number observed on any one of 76 visits was 39 (36.1 per cent). This population exhibited constant fluctuation throughout the study period, bats entering and leaving freely. The sex ratio of 107 marked bats was 55.1 per cent males. Some data regarding progressive weight loss were obtained. The length of time required for an animal to lose one gram varied from 6.6 to 50.9 days. Female weights average more than those of males."

Pearson, Oliver P. (MVZ, U. Calif., Berkeley.) A TOXIC SUBSTANCE FROM THE SALIVARY GLANDS OF A MAMMAL (SHORT-TAILED SHREW). p. 55-58, 1 fig., in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Pucek, M. (Inst. Mammalogy, Bialowieza, Poland.) THE TOXIC ACTIVITY OF GLANDULAE SUBMAXILLARES OF NEOMYS FODIENS FODIENS SCHREB. Bul. Acad. Polonaise Sci. Ser. Sci. Biol. 5(9): 301-306. 1957. [From Biol. Abs. 32(5).]

In German. Watery extract from salivary glands of N. f. fodiens has a pronounced toxic activity when injected into mice or frogs; it is, however, weaker than extract from glands of Blarina brevicauda, as described by Pearson. The pharmacological effects of both poisons are very similar. Observations on living shrews demonstrate that the poison is used in the hunting activities of the animal.--H. Szarski.

Smith, Elizabeth, and Woodrow Goodpaster. (Pa. State U., Erie.) HOMING IN NONMIGRATORY BATS. Science 127(3299): 644. Mar. 21, 1958.

Presumably nonmigratory Eptesicus fuscus caught at Cincinnati, Ohio, were released 450 mi. north or 340 mi. southwest. "Two of 18 (11 percent) bats returned from Tennessee; seven of 155 (4.6 percent) returned from Michigan. However, the difficulties encountered in collecting bats in large attics and barns make our recapture figures minimal, and no significance can be attached to the difference in percentage of bats returned. In our experiments, bats returned 450 miles south within a month or less, and 340 miles northeast within 2 weeks or less, to their original roosts, over unfamiliar territory."

Tibbetts, Ted. (Texas Tech. Coll., Lubbock.) HOMING INSTINCTS OF TWO BATS, EPTESICUS FUSCUS AND TADARIDA MEXICANA (MAMMALIA: CHIROPTERA). SW. Nat. 1(4): 194. 1956. [From Biol. Abs. 32(6).]

Verschuren, Jacques. ECOLOGIE, BIOLOGIE ET SYSTEMATIQUE DES CHEIROPTERES. Inst. Parcs Nationaux Congo Belge. Exploration Parc Natl. Garamba. Pt. 7: 1-473, illus, map. 1957. [From Biol. Abs. 32(5).]

This monograph is the result of 24 months study of bats in the Garamba Natl. Park in extreme ne. Belgian Congo. There are initial chapters on ecology, sex-ratios, population dynamics, sociability, food habits, reproduction, habits, contact with man, classification, study techniques. For each sp. there are data and discussion on specimens collected, distribution of sp. and sspp. both general and within the park, external and cranial measurements, coloration, genitalia, external morphology, age variation, systematics, ecology, sex-ratios, sociability, food habits, reproduction, other natural history and methods of capture.--C. O. Handley, Jr.

RABBITS AND PIKAS

Allen, Durward L. (Purdue U., Lafayette, Ind.) Rx FOR RABBITS. Field & Stream 63(1): 74-75, 137-139, 3 photos. May 1958.

Cottontails can be increased to a considerable extent by provision of sericea patches, release cutting of woods edges, and big brush piles. An area that has plenty of edge between thick cover and openings has built-in protection for rabbits against predators. "If an area can't grow a reasonable game crop in spite of predators, it's not a good habitat. It needs working on." Fertile soil helps grow good crops of rabbits, but is a luxury wildlife managers seldom can afford. Proper habitat management makes it possible to produce rabbits on soils that are not the best. Stocking has failed repeatedly to produce rabbits but habitat improvement has succeeded in many places. A heavy kill of bunnies is not only permissible but beneficial to the population.

Ardran, G. M., F. H. Kemp, and W. D. L. Ride. (Oxford U., Eng.) A RADIOGRAPHIC ANALYSIS OF MASTICATION AND SWALLOWING IN THE DOMESTIC RABBIT: ORYCTOLAGUS CUNICULUS (L.). Proc. Zool. Soc. London 130(2): 257-274, 5 figs., 7 pl. Mar. 1958.

Detailed study that provides much knowledge of biting and chewing, tooth wear, tongue movements, and anatomy of structures involved.

Dawson, Mary R. LATER TERTIARY LEPORIDAE OF NORTH AMERICA. U. Kans. Paleo. Contrib., Vertebrata, Article 6: 1-75, 39 figs., 2 pl. May 1958. 25¢ mailing charge.

This detailed paleontological study gives much information on taxonomy, morphology, and phylogeny of extinct Am. leporids.

Dell, Joseph. (Orchard St., Delmar, N. Y.) WANT MORE RABBITS? PART 2. N. Y. State Cons. 12(6): 10-12, 6 photos. June-July 1958.

Second of 2 articles for clubs and others interested in cottontail management. Emphasis of Part 2 is on improvement of summer food and cover. An unmanaged area tends to grow past the stage favorable for cottontails, even if it doesn't change greatly in appearance. Stocking more rabbits is no help. What will help is to provide a good blend of high-quality grassland, brush, and very young trees. Of all rabbits born, 35% die before leaving the nest. This loss might be reduced by maintaining plenty of good summer and winter cover close to the ground--preferably on well-drained rather than low spots. Very acid, moss-grown soils are not favorable for rabbits; they can be improved by working in lime and fertilizer. Good feeding areas should be kept that way by keeping down coarse weeds and brush with mowing and herbicides, and by liming and fertilizing as needed. Clovers respond especially well to this treatment. On areas managed for rabbits, mowing of large fields should be confined to strips 10-20 ft. wide and 20-40 ft. apart. This gives alternation of food and cover. In places it may be necessary to break sod and plant food patches. These patches should adjoin good escape cover on 2 or more sides. They need not be more than 20 ft. wide if next to cover on 1 side, or 40 ft. if they have cover on opposite sides. Summer foods also can be provided by clearing land to establish herbaceous plants. This helps rabbit populations but is too costly to achieve and maintain to be used except where truly needed. Good food plants to encourage in N. Y. are Ky. bluegrass, ladino clover, alfalfa, red clover, orchard grass, and red top. Domestic rye grass and winter wheat, although annuals, provide green food in late fall and early spring, and serve as nurse crops for perennials. Buckwheat, soy beans, vetch, and millet are well used by rabbits, as are many weeds listed. Presence or absence of plants that are being used heavily by rabbits should be determined before launching expensive alterations. A rabbit has a small range, so good habitat for both summer and winter should be well distributed over an area.

Fennessy, B. V. THE CONTROL OF THE EUROPEAN RABBIT IN NEW ZEALAND. C.S.I.R.O. (Melbourne), Wildl. Surv. Sec., Tech. Pap. no. 1. 1-40 p., 1 graph. 1958.

Summary: "The history of the invasion of New Zealand by the European rabbit, Oryctolagus cuniculus (L.), and the development of an industry based on the harvesting of this animal are outlined. Various legislative measures have been developed for the suppression of the rabbit as a pest. The most successful of these has been the 'killer policy' evolved in 1947 and which transferred the onus for control of rabbits from individual landholders to locally elected Rabbit Boards for which both landholders and the Government provide funds. Employees

of the Boards undertake all rabbit control work in their districts. Legislation also ensures that the rabbit no longer has any commercial value. Trading in skins and carcasses is prohibited. The work of these Boards and of the Rabbit Destruction Council which supervises and coordinates their activities is described. The success of the killer policy has been due more to the effectiveness of the system of organization rather than to any particular technique of control. Myxomatosis has been ineffective. Large-scale poisoning campaigns have involved the use of phosphorus or arsenic, and recently, sodium fluoracetate ('1080'). Aerial poisoning has been an outcome of New Zealand's well-developed agricultural aviation industry. The significant effect on agricultural production of the removal of a large rabbit population is shown. The significance of biological influences on the rabbit population is discussed. The success of the killer policy in New Zealand may provide a lesson for Australia."

Howard, Walter E. (U. Calif., Davis.) RABBIT CONTROL IN NEW ZEALAND. Calif. Livestock News 34(25): 14. June 24, 1958.

N. Z. is now spending more than $2.00 per capita for control of Eur. rabbits. It is getting good results from aerial distribution of poisoned bait. "It was my good fortune in 1957 to have an opportunity to study the habitat requirements of the European rabbit on a Research Fulbright with the New Zealand and Australian governments. My observations certainly bore out that this rabbit colonizes bareness. It thrives on depleted eroded country, or where the grass is in turf conditions. It is a short grass rather than tall grass animal. It likes patches of scrub, prefers annual plant types to perennials, it is favored by close grazing, it prefers light sandy soils that are well drained and it does well in rocky areas. Low rainfall favors this rabbit and drought conditions are its friend. It does well on wide river bottoms that have lots of exposed gravel. Burned areas that are not reseeded favor this animal. As a result of my studies ...I am certain that this animal would do very well in the arid portions of the United States, in the regions of sand dunes, semi-desert localities, or areas where the plant types are primarily annual rather than perennial. Grazed areas with less than 30 inches of rainfall, especially if there is no summer rain, are vulnerable... If California farmers do not want to face the worst animal enemy in their agricultural history, they must maintain constant vigilance to keep the European rabbit out of this state." [It should be noted that the same animal has been a major pest in England, where many of the conditions described by Howard do not prevail. In other words, this rabbit surely would find some parts of the U. S. more favorable than others, but no large section of the country can be considered safe against the beast becoming a serious pest.]

Jacotot, H., A. Vallée, and B. Virat. A CASE OF MYXOMATOSIS IN THE HARE. Ann. Inst. Pasteur 86(1): 105-107. 1954. [From German abstract by Mendheim in Z. Jagdwissensch. 3(1).]

In French. Description of hare with characteristic symptoms of myxomatosis. A suspension made from ticks on the hare killed a healthy rabbit following injection.--Vagn F. Flyger.

Kilham, Lawrence. (7815 Aberdeen Rd., Bethesda, Md.) TERRITORIAL BEHAVIOR IN PIKAS. J. Mamm. 39(2): 307. May 1958.

Lee, D. J., A. L. Dyce, and A. K. O'Gower. (U. Sydney, Australia.) BLOOD-SUCKING FLIES (DIPTERA) AND MYXOMATOSIS TRANSMISSION IN A MOUNTAIN ENVIRONMENT IN NEW SOUTH WALES. Australian J. Zool. 5(4): 355-401, 4 figs., 20 photos. 1957.

Myers, K., and R. Mykytowycz. (Wildl. Surv. Sec., C.S.I.R.O., Albury, N.S.W., Australia.) SOCIAL BEHAVIOR IN THE WILD RABBIT. Nature 181(4622): 1515-1516. May 31, 1958.

A summary of findings from much study of Oryctolagus in pens of about 2 acres. Rabbits strongly tend to form communal groups. Membership and areal limits of groups are well defined. Males of each group have strong dominance heirarchy. Highest ranking buck can range all over his group's territory; he monopolizes ♀♀ so far as possible. Lowest ranking ♂ has little chance to mate. Group territories are generally respected; they are defended by ♂♂, especially during breeding season. Within the group territory, individuals "possess home ranges

within which they rest, feed, and reproduce. The home ranges of the different members of the group overlap to a considerable extent. Their boundaries are not defended, and are in fact not precisely defined, as is the boundary of the group territory. The home range is merely a piece of land that the animal knows well, and to which its main daily activities are restricted. In males, the size of the home range depends upon status in the peck order, that of the dominant buck being virtually the same as the group territory." When breeding is well under way, a ♀ has litters at regular monthly intervals, owing to a short post-partum estrus. In the pens, groups of ♀♀ tend to have their litters at the same time, perhaps initiated by mutual stimulation. Because many ♀♀ are in estrus at once, the dominant ♂ cannot monopolize them all. The peck order is thus neutralized to some extent.

Negus, Norman C. (Tulane U., New Orleans, La.) PELAGE STAGES IN THE COTTONTAIL RABBIT. J. Mamm. 39(2): 246-252, 1 fig. May 1958.

Summary: "Pelage stages in the cottontail rabbit in Ohio were found to be closely related to age and reproductive activity. In young rabbits pelage stages indicative of specific age groups are described. These are designated as nestling fur, molt to juvenal pelage, juvenal pelage, molt to subadult pelage, and subadult pelage. Two distinct molts occur in adult cottontails contrary to reports that a single continuous molt occurs. The onset of adult molting appears related to reproductive activity. The relationship of pelage stages to reproductive activity in young and adult rabbits is discussed."

Perevalov, A. A. CONTRIBUTION TO THE BIOLOGY OF REPRODUCTION IN THE SANDHARE LEPUS TOLAI PALLAS - LEPORIDAE. Zool. Zhur. 35(1): 141-154, 1956. [From Biol. Abs. 32(5), from Referat. Zhur., Biol., 1956, No. 86635.]

In Russian. See abstract in Biol. Abs. 32(5).

Rieck, W. (U. Göttingen, Hann. Münden, Germany.) STUDIES ON THE REPRODUCTION OF THE EUROPEAN HARE. Z. Jagdwissensch. 2(2): 49-90, 8 figs. 1956.

In German with English summary. Females of Lepus europaeus av. 3-4 litters per year and 2-3 young per litter. Annual breeding potential is about 9 young per ♀. Although hares can breed when 8 months old, few born in March have litters in following autumn. Superfetation has little real effect on production. Age of hares was determined by feeling, with fingernail, for epiphyseal groove between distal cartilage of ulna and the diaphysis. Coccidiosis (Eimeria perforans), which is worst in wet summer and fall, is the most important cause of death of young hares. Predators and accidents are also important. Pasteurella multocida is most frequent cause of death of old hares. About 60% of young are shot in year of birth. A population may increase 80% in a year if no young are lost. Data are given on weights. They show that young and adults overlap grossly in weight in shooting season. Much speculation is presented on the increase and decrease of hare populations in various hunting districts. Suggestions are given for improving hunting systems.--V. F. Flyger.

Sheffer, Dale E. (R.F.D. 3, Gettysburg, Pa.) MARYLAND STUDIES OF RABBIT STOCKING. Md. Cons. 35(2): 28-29, 1 photo. Mar. 1958.

Concise summary of 3 years' results: In 1955, 20 adult native cottontails were released on a 50-acre area 10 days before hunting season. Three were found dead, but not one was shot or trapped. In 1956, pen-reared young were released. Fifty were released on a 50-acre farm in June-July. Two were shot and one was trapped on area. Forty were released on a 40-acre farm in Oct. Three were shot and 1 was trapped. In 1957, pen-reared young were again used. Thirty were stocked on a 30-acre tract in June-July. Five were shot and 3 trapped later. Forty were stocked on a 50-acre tract in Sept.-Oct. Eight were shot but none was trapped. In all of these 5 trials, hunters bagged about 2 to 5 times as many wild native rabbits as they did stocked rabbits. Stocked rabbits cost more than $1.25 each, and since few were bagged or trapped later, author concludes that the return on the investment was not high enough.

Sheffer, Dale E. (R.F.D. 3, Gettysburg, Pa.) RABBIT PROPAGATION EXPERIMENTS 1957. Md. Cons. 35(3): 6-8, 2 figs. May 1958.
More data on the Md. tests. Eight pens, each of 1/16-acre, were used. They were stocked with 1 ♂ to 3, 4, or 5 ♀♀. Drought and its destruction of vegetation in pens stopped reproduction by July 1. Certain private pens where drought effect was not felt did not experience this stoppage. In author's pens, production of young through June av. 12 for pens with 3 ♀♀, 20 for pens with 4 ♀♀, and 15 for pens with 5 ♀♀. However, 5 ♀♀ per pen were too hard on vegetation. Even 4 ♀♀ per pen required good vegetation. Net production of all pens was 116. There were 76 losses of young, including 29 from desertion and 29 from crows.

RODENTS--MISCELLANEOUS

Broadbooks, Harold E. (S. Ill. U., Alton, Ill.) NORTHWARD EXTENSION OF THE KANGAROO RAT IN WASHINGTON. J. Mamm. 39(2): 299-301. May 1958.
Dipodomys ordii has crossed the Columbia in Washington. Much suitable habitat lies ahead. It will be interesting to note the rate of spread.

Delost, P. ANATOMIE ET STRUCTURE HISTOLOGIQUE DE L'APPAREIL GENITAL DU CAMPAGNOL DES CHAMPS (MICROTUS ARVALIS PALLAS) ADULTE EN ACTIVE SEXUELLE. Bul. Soc. Zool. France 45: 207-222. 1955. [From J. Mamm. 39(2).]

Delost, P. ÉTUDE DE LA BIOLOGIE SEXUELLE DU CAMPAGNOL DES CHAMPS (MICROTUS ARVALIS P.). Arch. Anat. Micros. et Morph. Exp. 44(2): 150-190, illus. 1955. [From Biol. Abs. 32(5).]
In French. See abstract in Biol. Abs. 32(5).

Delost, P. RECHERCHES SUR LA BIOLOGIE GÉNÉRALE DU CAMPAGNOL DES CHAMPS (MICROTUS ARVALIS PALLAS). Bul. Soc. Zool. France 45: 149-162. 1955. [From J. Mamm. 39(2).]

Frank, Fritz, and Klaus Zimmermann. ÜBER DIE BEZIEHUNGEN ZWISCHEN LEBENSALTER UND MORPHOLOGISCHEN MERKMALEN BEI DER FELDMAUS. Zool. Jahrb. (Jena) 85(3): 283-300. July 1957. [From J. Mamm. 39(2).]

Gunther, W. C. SOME DIETARY EFFECTS ON THE ESTROUS CYCLE OF THE FEMALE CALIFORNIA POCKET GOPHER, THOMOMYS BOTTAE NAVUS MERRIAM. Proc. Ind. Acad. Sci. 66: 331-336. 1957. [From J. Mamm. 39(2).]

Johnston, Richard F. (New Mexico Coll. A & M, State College.) BREEDING OF THE ORD KANGAROO RAT (DIPODOMYS ORDII) IN SOUTHERN NEW MEXICO. SW. Nat. 1(4): 190-193. 1956. [From Biol. Abs. 32(5).]
In Dona Ana Co., D. ordii had a breeding season extending from the last 2 weeks in Feb. to the first 2 weeks in June in 1956. The modal date for births was April 1. Females probably had 2 litters per season and averaged 2.37 embryos per pregnancy; since the adult sex-ratio was probably 1:1, the populational birth rate was no higher than 237%.--Auth. Abst.

Kennerly, Thomas E., Jr. (Baylor U., Waco, Texas.) COMPARISONS OF MORPHOLOGY AND LIFE HISTORY OF TWO SPECIES OF POCKET GOPHERS. Texas J. Sci. 10(2): 133-146, 3 figs. June 1958.
Summary: "Ninety-one specimens of Geomys bursarius attwateri and 113 specimens of G. personatus fallax were trapped in south Texas... Burrow diameter was found to vary according to sex and species. Seventeen skeletal and three external dimensional characters were measured and expressed graphically. Sexual dimorphism in both species was pronounced in all characters except one. In G. personatus males averaged 9.67% larger than females. Information on breeding activity, multiple catches and sex-ratio was recorded. Range extensions of about 35 miles for G. personatus and about 25 miles for G. bursarius were reported."

King, John A. (Jackson Memorial Lab., Bar Harbor, Maine.) MATERNAL BEHAVIOR AND BEHAVIORAL DEVELOPMENT IN TWO SUBSPECIES OF PEROMYSCUS MANICULATUS. J. Mamm. 39(2): 177-190, 5 graphs. May 1958.

Kirner, S. H., K. R. Barbehenn, and B. V. Travis. (Travis: Cornell U., Ithaca, N. Y.) A SUMMER SURVEY OF THE PARASITES OF TWO MICROTUS PENNSYLVANICUS (ORD) POPULATIONS. J. Parasit. 44(1): 103-105. Feb. 1958.

Seasonal incidence of 3 hemoparasites (Babesia microtia, Trypanosoma microti, and Haemobartonella microti) was studied June-Oct. 1954 in 2 areas near Ithaca, N. Y. One area was wet, 1 dry. "Sporozoan infections were most prevalent in the wet field, prevalence of the bacterium was highest in the dry field, and tended to diminish during the course of the study. The number of trypanosome infections tended to remain constant and equal in both areas. Some favorable interaction between the trypanosome and the sporozoan in multiple infections was observed, as well as a possible unfavorable interaction between the bacterium and the trypanosome and the bacterium and the sporozoan. There was no significant effect of the parasites upon mortality of the mice, nor was there any significant difference in rates of infection between sexes or among age groups."

Laycock, Wm. A. (U. Wyo., Laramie.) THE INITIAL PATTERN OF REVEGETATION OF POCKET GOPHER MOUNDS. Ecology 39(2): 346-351. Apr. 1958.

Study of plants growing up through or seeding into gopher mounds in Teton Co., Wyo.

McCarley, Howard. (S. F. Austin State Coll., Nacogdoches, Texas.) ECOLOGY, BEHAVIOR AND POPULATION DYNAMICS OF PEROMYSCUS NUTTALLI IN EASTERN TEXAS. Texas J. Sci. 10(2): 147-171, 2 figs. June 1958.

Summary: "Peromyscus nuttalli in eastern Texas was investigated by using live traps on two 13.0 acre study plots in the lowlands and one 8.0 acre plot in the uplands, marking the mice, releasing them at the site of capture, and studying them by subsequent recapturing. This study extended over a 27 month period. In eastern Texas golden mice are restricted to a forested habitat and the main factor that controls their ecologic distribution is a dense growth of underbrush regardless of whether it is in the upland or lowland. Golden mice in eastern Texas are at least partly arboreal but apparently do not construct arboreal nests as has been reported elsewhere. The average length of life in the wild for both males and females is about 6.5 months. The period of greatest population density (2.2/acre) is in the late spring as a result of a breeding pattern which begins in September and continues through the cooler months of the year. The average size of the home range of nuttalli is approximately 1.42 acres with no significant difference between males and females. There was a considerable overlapping of home ranges of individuals of both sexes with no evidence of territoriality. These mice are inclined to be gregarious in their social behavior."

Pfeiffer, E. W. (U. of N. Dak., Grand Forks.) THE REPRODUCTIVE CYCLE OF THE FEMALE MOUNTAIN BEAVER. J. Mamm. 39(2): 223-235, 2 pl., 2 figs. May 1958.

Good study of anatomy and function.

Quay, W. B., and J. F. Quay. (U. Mich. Med. Sch., Ann Arbor.) THE REQUIREMENTS AND BIOLOGY OF THE COLLARED LEMMING, DICROSTONYX TORQUATUS PALLAS, 1778, IN CAPTIVITY. Säugetierk. Mitt. (Stuttgart) 4(4): 174-180. Oct. 1956. [From J. Mamm. 39(2).]

Reynolds, Hudson G. (Rocky Mtn. For. & Range Exp. Sta., Ft. Collins, Colo.) THE ECOLOGY OF THE MERRIAM KANGAROO RAT (DIPODOMYS MERRIAMI MEARNS) ON THE GRAZING LANDS OF SOUTHERN ARIZONA. Ecol. Monog. 28(2): 111-127, 10 figs. Apr. 1958.

Aside from a brief review of life history, this paper is a serious consideration of the ecology of D. merriami in relation to range management. Distribution of the species is limited by heavy or rocky soil, deep snow, high precipitation, low temperatures, and high density of perennial grass. Numbers fluctuated between 1.4 and 7 per acre over several years, and were highest in July. Numbers were governed mainly by effects of precipitation. Seeds of many kinds constituted 95% of food. Animals maintained weight on 5 g. rolled barley per day. These kangaroo rats store seeds in shallow diggings; some seeds are eaten later, others may germinate. Burrows are shallow; they have little effect on soil condition or soil moisture. "Within their altitudinal range, Merriam kangaroo rats are more abundant on ranges grazed by domestic livestock. Grazing so heavy as to lower perennial grass density results in an increase in their numbers. On rangelands in good to excellent condition, the seed burying habits of Merriam kangaroo rats

are probably beneficial to range maintenance and improvement. On the other hand, the spread of mesquite and cactus on infested range is favored somewhat by the presence of these animals." Spread of cactus and mesquite is not, however, dependent on rodents. If reseeding is to be done with large seeds, control of D. merriami is wise and is relatively cheap. But control of D. merriami is not necessary for control of mesquite. Rather, removal of mesquite and control of grazing can result in dense grass and thereby in reduction of D. merriami.

Sillman, E. I. (Ont. Agr. Coll., Guelph.) FURTHER LABORATORY AND FIELD OBSERVATIONS ON THE ECOLOGY OF SOME ONTARIO CUTEREBRIDAE (DIPTERA), IN PARTICULAR, CUTEREBRA ANGUSTIFRONS DALMAT 1942. Ann. Rep. Ent. Soc. Ont. 87: 28. 1956. [From long abstract in Biol. Abs. 32(3).]
Biology of parasite of Peromyscus leucopus.

Tikhomirov, B. A. THE EFFECT OF THE OB LEMMING (LEMMUS OBENSIS BRANTS) ON THE PLANT COVER OF THE TUNDRA. Doklady Akad. Nauk SSSR 104(4): 650-652. 1955. [From Biol. Abs. 32(3), from Referat. Zhur., Biol., 1956, No. 57258.]
In Russian. A study was made on central and northern Taimyr of the action of ob lemming on plant cover of the tundra. After years of mass lemming breeding, cotton grass, Eriophorum angustifolium, which serves in winter as principal food, sends out only vegetative shoots since lemmings eat around reproductive buds. The dry parts of the plant which remain after feeding and which amount to 10 to 20 centners/hectare are carried away by waters in the spring into depressions in the surface where they form elongated turf mounds, creating a characteristic microrelief of small mounds. In spring lemmings' paths occupy up to 20% of the tundra area; mossy cover at the bottom of the passages is tightly packed, which leads to stagnation of water and retention of water melted from soil and also makes possible formation of small-mound landscape and variegation of plant cover. When constructing nesting burrows in the summer, rodents eject to the surface 6 to 250 kg of earth/hectare. On these ejecta characteristic vegetation appears. Activity of lemmings, having lasted for milleniums, is one of the important factors in determining tundra landscape.

RATTUS AND MUS

Barnett, S. A. (Glasgow U., Scotland.) AN ANALYSIS OF SOCIAL BEHAVIOUR IN WILD RATS. Proc. Zool. Soc. London 130(1): 107-152, 3 pl., 1 graph. Jan. 1958.
Long, well-documented paper based on experiments. Wild R. norvegicus and R. rattus were caged under different social conditions but with excess of food and water. R. norvegicus: In all-male colonies there was low mortality; weight gains were common. In male-female colonies, mortality was high only in ♂♂; most ♂♂ lost weight, some gained. Males did not fight for ♀♀, but probably from excitement and frustration. There were no deaths in colonies of ♀♀ or litter mates. Females were seldom aggressive. Males, but not ♀♀, added to colonies, were attacked by ♂♂ and usually died, often without visible injury. Males were of 3 classes: 1) dominants, attackers; 2) subordinates, ingratiating to newcomers; 3) persecuted, soon died. First 2 classes gained weight, third lost. Amicable behavior was demonstrated by both sexes and was based mainly on contact 'releasing' stimuli. Fighting involved stereotyped acts; it produced only superficial damage despite the number of deaths. R. rattus: Less fierce and more agile, but has same components of amicable and aggressive behavior as R. norvegicus. Male-female colonies had no extra conflict. All-male colonies containing both species were usually peaceful. R. rattus added to norvegicus colonies were attacked less than were ♂ norvegicus. They died if attacked. R. norvegicus ♂♂ added to R. rattus colonies were sometimes attacked but did not die. General: Dominance heirarchies were not noted. Members of a family do not attack each other. Fighting is essentially territorial. Aggression appears quickest when a resident ♂ meets strange adult ♂. Females normally are aggressive only in nest defense. Social responses are stereotyped and probably innate, but learning is important in adjustment of behavior to circumstances.

Bjornson, Bayard F., and Charles V. Wright. CONTROL OF DOMESTIC RATS AND MICE. US Pub. Health Serv., Atlanta, Ga., CDC Training Handbook, Pub. Health Serv. Publ. no. 563. 11 + 25 p., illus. 1956, reprinted 1957. 25¢ from Supt. Documents.

Takes up significance of these rodents in disease, characteristics of rats and mice, recognition of signs, control by sanitation, control by various poisons, trapping, gassing, ratproofing, control of ectoparasites, and control of dead-rodent odors. Includes many helpful drawings and practical suggestions.

Davis, R. A. (Min. Agr., Hook Rise, Tolworth, Surbiton, Surry, Eng.) HOUSE MICE ON SKOKHOLM ISLAND. Skokholm Bird Observatory Reports, 1957: 26. 1958?

Seven feral Mus marked as adults in Sept., and one marked in June, were retrapped in Apr.-May. Thus some adult Mus survive winter and live 7-10 months. Four of these mice had moved 3/4 mile, 1 was in original range, 1 had moved about 50 yards, and 2 about 100 yards. The island is so small all its mice can be considered to be of 1 colony. Marked mice have been known to move as much as 200 yards in 1 night and 1/4 mile in 5 nights. Mus have been found in every island habitat trapped. Stomach contents and droppings show that house mice eat not only plant material but many insects and some centipedes. Limited evidence indicates that these island mice are larger and heavier than those of the mainland.

SCIURIDS

Anon. NEW SQUIRREL BOX DESIGN. Wildl. in N. C. 22(6): 17, 4 figs. June 1958.

Diagrams and bill of materials for simple new box, front of which can be removed easily for cleaning.

Clark, Gordon Marston. (Patuxent Refuge, Laurel, Md.) HEPATOZOON GRISEISCIURI N. SP.; A NEW SPECIES OF HEPATOZOON FROM THE GREY SQUIRREL (SCIURUS CAROLINENSIS GMELIN, 1788), WITH STUDIES ON THE LIFE CYCLE. J. Parasit. 44(1): 52-63, 17 figs. Feb. 1958.

Summary: "Hepatozoon griseisciuri n. sp. is described from...the eastern grey squirrel. Sporogony in the mites Echinolaelaps echidninus in the laboratory and Fuhaemogamasus ambulans from squirrel nests in the field is reported. Schizogony in the spleen, liver, and bone marrow of a squirrel 36 hours old is described."

Hawbecker, Albert C. (Fresno State Coll., Fresno 26, Calif.) SURVIVAL AND HOME RANGE IN THE NELSON ANTELOPE GROUND SQUIRREL. J. Mamm. 38(2): 207-215, 4 figs. May 1958.

This squirrel is easily trapped with bait of rolled oats. The animals are soon killed by hot sun and young are killed by cold above freezing. There is no evidence of hibernation or aestivation. Mortality is highest in first year and is high in adults. Maximum age seems to be nearly 6 years. More young survive in years of good food supply. There is 1 breeding season a year. Normal home range (here the area that includes all sites of capture) is about 11 acres, but a few much longer travels occur.

Müller-Using, D. (U. Göttingen, Hann. Munden, Germany.) MATING BEHAVIOR OF MARMOTS. Z. Jagdwissensch. 3(1): 24-28, 6 photos. 1957.

In German. In Austria near Berchtesgaden, marmots awaken from hibernation in April and frequently must dig their way thru deep snow at this time. They play actively with one another. They copulate during spring and the female mates with several males. Oestrus lasts about 1/2 day.--Vagn F. Flyger.

Orlova, A. F. THE INFLUENCE OF A DRY SUMMER ON THE TIMES OF PROPAGATION OF THE SMALL SIBERIAN MARMOT. Doklady Akad. Nauk SSSR 105(6): 1068-1370 [sic]. 1955. [From Biol. Abs. 32(5), From Referat. Zhur., Biol., 1956, No. 77698.]

In Russian. On the basis of a fundamental histologic investigation of the sexual glands of male and female small Siberian marmots of various age groups, and also of a comparison of all these rodents in different years, the conclusion is drawn that the nutritional conditions of the preceding year, acting on the

gonads, determine the character of the propagation of the marmots. A dry summer induces retardation and prolongation of reproduction in the following spring. Favorable nutritional conditions promote unanimous and intensive propagation. Yearling males, of little importance in the generative climax, have gonads which are not completely ripe. Thus they apparently do not take part in the propagation of that year.

Parker, Dale D. (Ecol. Res., U. Utah, Dugway.) SEASONAL OCCURRENCE OF FLEAS ON ANTELOPE GROUND SQUIRRELS IN THE GREAT SALT LAKE DESERT. J. Econ. Ent. 51 (1): 32-36, 3 figs. Feb. 1958.

Sharp, Ward M. (Pa. State U., U. Park.) THE ART AND TECHNIQUE OF LIVE-TRAPPING GRAY SQUIRRELS. Pa. Coop. Wildl. Res. Unit, Pa. State U. (U. Park), Spec. Rep. no. 3. 12 unnumbered p., 5 figs. Apr. 1958.

Detailed instructions for trapping and handling squirrels for research purposes. Procedures recommended appear to be quite different from those in common use. Author recommends extensive prebaiting with corn in hanging basket, then setting several traps on ground near trees with baskets, and prebaiting traps for some time before trapping. Wooden, metal-lined trap with glass back is advocated. So is a special handling cage with mechanism to restrain squirrel. When trapping success drops off, quit trapping and leave traps open but baited for a few days. Small monel metal tags should be used. They should be inserted near tip of ear, not front or back, and not too deeply. Trapping success varies with weather and other factors, but is best in late winter and early spring.

Smith, Ronald E. NATURAL HISTORY OF THE PRAIRIE DOG IN KANSAS. U. Kans. Mus. Nat. Hist. & State Biol. Surv., Misc. Publ. no. 16. 1-36 p., 4 pl., 9 figs. June 1958.

Interesting and informative report of studies made of a colony in Barber Co., 1955-57. Prairie dogs occupied about 2,000,000 acres in Kans. in 1903, but by 1957 they occupied no more than 57,045 acres. A fourth of the latter acreage was scheduled for control in 1957. At this rate, prairie dogs will be gone from Kans. in 10 years. Prairie dogs live only where overgrazing by bison or livestock reduces plant cover. Give the vegetation a chance and prairie dogs disappear. Smith gives new evidence of this. He also gives much information on foods, communication, intraspecific contacts, daily routine, behavior in relation to weather and season, relations with other animals, molt and pelage, reproduction, burrows, population and its changes, and present distribution in Kans. Breeding began about last of Jan. and lasted 2-3 weeks. Gestation lasted 30-32 days. Av. litter was 4. The colony, which was at least 30 years old, expanded by 25 acres in 4 years. Unsuitable conditions caused emigration, usually in pairs, to more favorable areas which were usually within 5 mi. Mass migrations, however, have been reported by others. Concerning preservation of prairie dogs, the author points out that the rancher has a 2-fold obligation to his progeny: 1) to leave his land in better condition than he received it, and 2) to retain the aesthetic value inherent in the native plants and animals of that land. Proper management of livestock will insure a good cover of grass that is of monetary value, and will control numbers of prairie dogs without annihilating the species.

Svihla, Arthur. (U. of Wash., Seattle 5.) SUBFREEZING BODY TEMPERATURES IN DORMANT GROUND SQUIRRELS. J. Mamm. 38(2): 296-298. May 1958.

BEAVER

Brenn, E. Wayne. (US Soil Cons. Serv., Oakley, Kans.) BEAVERS DO THE JOB. Soil Cons. 23(11): 222-224, 2 photos. June 1958.

A farmer in Logan Co., Kans. needed a stockwater pond but soil conditions were not suitable for a man-made pond. Consequently, the farmer got 3 beavers from Kans. Game Comm. Since 1952 the beavers have increased to 10 and have built 12 ponds along the draw. "The small dams have raised the water table along the stream, and as a result, the bottom areas are covered with a lush growth of grass, wild flowers, willow, and cottonwood trees. With this rapid growth of plants, the area is developing into an ideal wildlife habitat. Hollister's son, Dick, says he is catching some nice pan fish from some of the ponds, as well as having

good duck hunting in the fall." "In this region, it may be necessary to plant trees to maintain a continuous supply of [beaver] food... Some large trees on the Hollister farm are protected by wrapping the base with heavy hail screen."

Chabreck, Robert H. (La. Wild Life Comm., Abbeville.) BEAVER-FOREST RELATIONSHIP IN ST. TAMMANY PARISH, LOUISIANA. J. Wildl. Mgt. 22(2): 179-183. Apr. 1958.

Plot sampling along streams occupied by beaver revealed that beaver used 22 woody plant spp. Sweetgum, sweetbay, spruce pine, and loblolly pine received heaviest use and were believed to be of greatest value to beaver. Many herbaceous plants were eaten in summer. On the plots, beaver barked 24% and cut down 18% of the woody plants present. The plants cut down were very small and of little significance to forestry. Less than 2% of the plants died from girdling. Most hardwoods, when barked, became susceptible to decay. Pine, when barked, became more vulnerable to fire damage and to attack by insects. Local beavers build few dams, but water impounded behind 1 beaver dam killed 20,647 bd. ft. of merchantable pine.--Author.

Hibbard, Edmund A. (Mus. Zool., U. Mich., Ann Arbor.) MOVEMENTS OF BEAVER TRANSPLANTED IN NORTH DAKOTA. J. Wildl. Mgt. 22(2): 209-211. Apr. 1958.

Recoveries were obtained from 18 of 155 ear-tagged beaver that were transplanted between 1947 and 1953. Seventeen animals were found to have moved an av. distance of 5.9 airline or 9.1 stream mi. An exceptional distance was covered by one beaver that traversed three drainages in 7 months to move 148 stream mi. or 67 airline mi.--Author.

MUSKRAT AND NUTRIA

Davis, W. B. (Texas A & M Coll., College Station.) DISTRIBUTION OF NUTRIA IN TEXAS. Texas Game & Fish 16(6): 22, 1 map. June 1958.

Author obtained nutria data from conservation officers. Results are shown on map. Nutria occur in most counties of e. and central Texas and they have caused reportable damage in 34 counties.

Sather, J. Henry. (W. Ill. U., Macomb.) BIOLOGY OF THE GREAT PLAINS MUSKRAT IN NEBRASKA. Wildl. Monog. no. 2. 35 p., 13 figs. May 1958. 50¢ from J. P. Linduska, Remington Farms, Chestertown, Md.

Report of 4-year study centered on Valentine Natl. Refuge in Sandhills. Evidence suggested that the muskrats were monogamous. Actual litter sizes av. 6.0 and 6.5 in 1950 and 1951. Numbers of placental scars per set av. 6.7, 6.8, and 7.1 in 3 winters. Placental-scar counts of precocial breeders in same winters av. 4.9, 5.0, and 4.5. Number of litters per year varied from 1-4 and av. 2.5. There were 3 peaks of litter production: late April to early May, June, and late Aug. to early Sept. Measurements and growth of young are described. Methods of ascertaining sex and age groups are discussed critically and at length. Av. sex ratio for adults in winter was 111 ♂♂ per 100 ♀♀. Av. for subadults was 149 ♂♂ per 100 ♀♀. Av. for young was 102 ♂♂ per 100 ♀♀. But for complete litters, av. was 96 ♂♂ per 100 ♀♀. Apparently some mortality factors affected mainly ♀♀ between birth and trapping and mainly ♂♂ between first and second winters. Winter age ratios were of questionable value for study of population density and effects of density on survival. Weights of muskrats are tabulated in good detail. Houses and house sites are discussed. Food habits are described; apparently more animal material was eaten when muskrats were abundant. Travel data suggest that muskrats were territorial in summer, fall, and winter. Spring migration began when ice broke up. Spring travels involved both cross-country travel and intra-marsh range changes. Only ♂♂ made intra-marsh changes; ♀♀ remained home. Intra-specific strife seemed to be associated with overpopulation. Predation and disease are discussed. Hemorrhagic disease seemed to correlate with overpopulation. Muskrats apparently tolerated crowding best during cyclic high. Precocial breeding increased during cyclic high. Cyclic changes could not be correlated with changes in environment. Census methods were compared: the best was "based upon the number of young per adult female in the winter harvest and the spring breeding-territory inventory..." Figures are given on economic importance of muskrats in Nebr. Difficulty of overtrapping is discussed and recommendation is made for best season of trapping. For maximum sustained production, water-level control would be necessary. Feasibility of this in the sandhills is not known.

Waldo, Ednard. THE NUTRIA STORY. La. Cons. 10(3): 8-11, 22-23, 9 photos. Mar. 1958.

General article on present and future economics of nutria and natural history of the beast. At present La. has less than half as many trappers as it had a decade ago. Nutria pelts sell for an av. of 80¢ to $1.00. If nutria fur can be popularized, perhaps price can be raised to $1.50. Inland, nutria do much damage to crops, levees, and other things; such damage is described. Pelts from these inland areas are not much good. The good pelts come from the marshes; there nutria compete to some extent with cattle, and their eat-outs make it hard to burn the marsh. Competition and conflict between muskrat and nutria is considered slight--the 2 species do not overlap completely in food and habitat preferences. Nutria eat-outs are said to revegetate in 1 season whereas muskrat eat-outs may take 8-10 years, because muskrats destroy the rootstocks and nutria do not.

FUR ANIMALS, GENERAL

Fuchs, Victor R. THE ECONOMICS OF THE FUR INDUSTRY. Columbia U. Press, N. Y. x + 168 p. 1957. $5.00. [From longer review in J. Am. Stat. Assn. 53(282).]

"The book should be of primary interest to members of the fur industry itself and to economists interested in industrial organization or in the theory of the firm or business cycle theory. It should also be received warmly by students of wildlife management--a field almost notable for its lack of economic study."--V. Schultz.

O'Neil, Ted. (La. Wild Life Comm.) A LOOK AT THE FUR INDUSTRY. La. Cons. 10(2): 6-9, 7 figs. Feb. 1958.

General discussion of what happened to fur business in La. In the period around 1940, the marsh was in good condition (though spotty as usual), fresh water was plentiful, fur market was good, and marsh was getting some practical management from trappers. About 1947, everything began to go wrong: weak fur market, too many muskrats for marsh, too much salinity because of drought and opening up of marsh by oil exploitation, and deterioration of marsh-management structures. The fur business was once worth $15-$20 million a year to La. Now it is down to $3-$4 million.

BEARS

Anon. AT LONG LAST A SOLUTION TO THE TROUBLESOME PROBLEM OF THE BEARS AND THE BEES. Fla. Wildl. 12(1): 14-17, 40, 10 figs. June 1958.

Each Fla. bear is worth $400 on the basis of hunter expenditures. But Fla. bear country is also honey-producing country. Beekeepers were killing about 175 bears a year, or about $70,000 worth of bears. Harmless booby-trap type exploders were tried. They seemed to prevent initial attacks on hives, but not habitual attacks. Electric fences had the same effect. But properly made platforms are 100% effective. They are placed on 8-ft. cypress posts and have a 2-ft. overhang at the top. A platform should last at least 15 years. It will protect 50 hives at a cost of about $8.50 a year, which is less than the value of one hive.

Krott, Peter. (Pinzolo, Trentino, Italy.) BEARS AND BEAR HUNTING IN NORTHERN EUROPE. Der Anblick (Graz) 13(1): 16-17. Jan. 1958.

In German. Bears are confined to parts of Norway, Sweden, Finland & Austria. In Scandinavia, they eat considerable amounts of berries and insects during the warm months. In cold weather they resort to roe deer, moose and reindeer. At times, they (especially ♂♂) destroy cattle during rut in late Aug. or early Sept. Bears remain in dens from early Nov. until mid April. They have a home range of about 25,000 ha. Males move great distances (up to 150 km) during rut. Young bears wander great distances and do not return to place of birth. About 60 bears are killed every year in Sweden and about 70 in Finland.--Vagn F. Flyger.

RACCOON, RINGTAIL, COATI

Leigh, W. Henry. (U. Miami, Fla.) CARNEOPHALLUS TURGIDUS SP. NOV. (TREMATODA: MICROPHALLIDAE) FROM THE RACCOON, PROCYON LOTOR, IN SOUTH FLORIDA. J. Parasit. 44(1): 100-102, 4 figs. Feb. 1958.
Several thousand specimens of this small trematode were recovered from 2 raccoons.

McKeever, Sturgis. (U. Calif., Davis.) REPRODUCTION IN THE RACCOON IN THE SOUTHEASTERN UNITED STATES. J. Wildl. Mgt. 22(2): 211. Apr. 1958.
Examination of ♀ raccoons from sw. Ga. and nw. Fla. indicated that they mated from Feb. to Aug. and gave birth from April to early Oct., with about half of births occurring in May. For 17 pregnant ♀♀, numbers of embryos ranged from 2 to 5, with av. of 3.2.--Author.

MUSTELIDS

Eadie, W. Robert, and W. J. Hamilton, Jr. (Cornell U., Ithaca, N. Y.) REPRODUCTION IN THE FISHER IN NEW YORK. N. Y. Fish & Game J. 5(1): 77-83, 3 figs. Jan. 1958.
Abstract: "Hand-sectioned ovaries of 39 fall- and winter-trapped fisher revealed corpora lutea in 23. The mean number of corpora lutea was 2.72; the mode was 3. Freshly recovered blastocysts, flushed from the uterine horns are described. Corpora lutea show a high degree of vacuolation in December specimens and the ovary has a high proportion of interstitial tissue. All breeding females showed at least partial fusion of the temporal ridges of the skull to form a sagittal crest, and the maxillary-palatine sutures were completely fused. Non-breeding females showed the temporal ridges in various degrees of separation and had the maxillary-palatine sutures at least partly open. It is concluded that female fisher normally breed at the age of one year in the wild, and that these criteria will separate young-of-the-year from adults. A frequency distribution of the length of the sagittal crest seemed to indicate at least three age groups in the sample of 87 skulls. Implantation probably takes place sometime in February since free blastocysts may be recovered in January and possibly in early February. A 75-millimeter (crown-rump) embryo was recorded for March 13."

Hamilton, Wm. J., Jr. (Cornell U., Ithaca, N. Y.) EARLY SEXUAL MATURITY IN THE FEMALE SHORT-TAILED WEASEL. Science 127(3305): 1057, 1 photo. May 2, 1958.
Evidence that ♀ M. erminea can have a productive mating in its first summer, while still young of year.

Kenyon, Karl W. (US F&WS, Sand Pt. Naval Air Sta., Seattle 15, Wash.) THE SEA OTTER. Oryx 4(3): 153-158, 1 fig., 1 pl. Nov. 1957.
Short but authoritative popular account of natural history.

Krott, Peter. (Pinzolo, Trentino, Italy.) DAS HEUTIGE VORKOMMEN DES VIELFRASSES (GULO GULO L.) IN EUROPA. Z. Säugetierk. 22: 208-213, 2 maps, 1 pl. 1957.
English summary: "The strong connection of the wolverine...with the biotope of the northern coniferous forest is caused by a biotic factor the wolf (Canis lupus L.). The range of the wolverine [mapped] has changed very little during historical time. Its habits and its behaviour make it very difficult to be captured by man. To-day in Europe the range of the wolverine extends from a broad belt along the Scandinavian mountains, through Lapland and through the European parts of the UdSSR more to the south as far as the Ural."

DOGS, WOLVES, FOXES

Adams, Arthur W. (N. Dak. Game Dept.) FOXES IN THE SOUTHWEST. N. Dak. Outdoors 20(9): 4-5, 2 figs. Mar. 1958.
N. Dak. started bounty on foxes in 1943. At first no foxes were bountied from the sw. part of N. Dak. Number of red foxes bountied rose only slowly to 66 in 1952-53, but then population increase got under way. Number leaped from 282 in 1953-54 to 1289 in 1956-57. Cause of increase is not known; it may be correlated with removal of coyotes. Upland game birds of the area have been doing well in recent years and show no effect of fox abundance. The great increase of red foxes has occurred in spite of the bounty. "It looks like we have paid out approximately $8,000 dollars in this area to build a healthy fox population."

Ballantyne, E. E. (Vet. Serv. Branch, Alberta Dept. Agr., Edmonton.) SYMPTOMS NOTED IN RABID COYOTES IN ALBERTA. Can. J. Comp. Med. & Vet. Sci. 22(3): 107-109. Mar. 1958.

Describes behavior of a number of coyotes that later proved rabid. The animals were abnormally bold, aggressive, tame, or vicious. Several entered yards and attacked dogs and people.

Ellis, Ralph Joseph. FOOD HABITS AND CONTROL OF COYOTES IN NORTHCENTRAL OKLAHOMA. M. S. thesis, Okla. State U. v + 45 p., 4 figs. May 1958. [Copy in US Dept. Int. Library.]

Based on study of 762 scats collected through 1 year from prairie and prairie-woodland areas. Cotton rats and rabbits were staple foods throughout year in both types. Other important foods were wood rats, pine mice, white-footed mice, livestock flesh, poultry, small birds, and insects. Coyotes appeared to present no significant threat to game populations. They seemed to prefer small herbivorous mammals and to dislike other types of mammals and cold-blooded vertebrates. Role of coyote was multiple: partial controller of rabbits and some rodents, predator on poultry and livestock, sport animal, and scavenger. Author recommends abolition of bounty and adoption of extension-type control system in Okla.

Halloran, Arthur F. (Wichita Refuge, Cache, Okla.) BLACK RED WOLVES. Okla. Wildl. 14(4): 6-8, 4 figs. Apr. 1958.

Valuable new data on range of Canis niger in Okla. Maps in published field guides to mammals show range of C. niger barely reaching Okla. Halloran's records (mapped) show that this wolf occurs in at least 16 Okla. counties, from the se. corner of the state n. to Adair and Wagoner counties and w. to Grady Co. There are old records from Comanche Co., Wichita Refuge. Apparently all records are from the oak forest regions of Okla. Since coyotes are often as large as red wolves or larger, and are hard to distinguish, Halloran obtained his records from government trappers and wildlife workers by asking only for records of black individuals. Blacks are "rather scarce" among red wolves, but very rare among coyotes.

Lande, O. (Flaaten Exp. Lab., Sande in Vestfold, Norway.) CHROMOSOME NUMBER IN THE SILVER FOX (VULPES FULVUS DESM.). Nature 181(4619): 1353-1354, 2 photos. May 10, 1958.

"The results...indicate that the diploid chromosome number in the male silver fox (Vulpes fulvus) is 38. This is not in agreement with Wodsedalik, who reported 42, and Bishop, who gave 32 as the diploid number. It seems that Vulpes vulpes and Vulpes fulvus have the same number of chromosomes. The karyotypes of the two species also seem to be similar to one another."

Layne, James N. (U. Fla., Gainesville.) REPRODUCTIVE CHARACTERISTICS OF THE GRAY FOX IN SOUTHERN ILLINOIS. J. Wildl. Mgt. 22(2): 157-163, 1 graph. Apr. 1958.

Reproductive data from 218 gray foxes collected in s. Ill. from Dec. 1954 to June 1955 are given. Over-all sex ratio in sample was 52% ♂♂ to 48% ♀♀. Based on data for ♂♂ only, yearlings comprised approximately 52% of population from Dec. through Mar. Estimated mating dates ranged from the last week in Jan. to end of Feb. All ♂♂ were fertile from Dec. through Mar. A mean litter size of 3.77 ± 0.13 (2-6) was obtained from counts of placental scars, uterine swellings, and fetuses. Based on estimates of the proportion of barren ♀♀ in the population, preplacentation loss of ova, and extent of resorption, a total prenatal mortality of approximately 32% was calculated.--Author.

Lever, R. A., C. J. Armour, and H. V. Thompson. MYXOMATOSIS AND THE FOX. Agriculture 64: 105-111. 1957. [From J. Animal Ecol. 27(1).]

"The food content of eighty foxes collected from areas to which myxomatosis had spread showed that they were still eating some rabbits, but voles (chiefly Microtus agrestis), sheep (some carrion), woodmice, brown rats, poultry, small birds and beetles were all taken fairly frequently."

MacLennan, J. M., translator. TRANSLATIONS OF RUSSIAN GAME REPORTS. VOL. 3. (ARCTIC AND RED FOXES, 1951-55). Can. Wildl. Serv., Ottawa. 1-214 p., 2 graphs, proc. 1958. $1.00, paper, from Queen's Printer, Ottawa, Ont., Can.

Third volume of the highly commendable series of translations from the Russian annual, "Biology of Furbearers." Volume 1 was on beaver (WR 89: 32) and Vol. 2 was on muskrat (WR 91: 58). Each of these volumes covers a number of Russian research reports, is very reasonable in price, and should be in every wildlife library. The present volume contains the following 10 papers: Dynamics of Arctic fox numbers in relation to breeding, food and migration conditions, by S. V. Shibanoff. A preliminary method of forecasting changes in numbers of Arctic foxes, by A. F. Tchirkova. Dynamics of fox numbers in Voronezh province and forecasting of fox harvests, by A. F. Tchirkova. Mange in wild foxes, by Yu. A. Gerasimoff. Mass diseases of foxes in the Crimea, by M. F. Pavloff. Experiments in mass visual census and forecasting harvest of Arctic foxes (1944-49), by A. F. Tchirkova. Biology of the Arctic fox in the Bolshezemelskaya tundra, by N. I. Dementyeff. Helminths in red foxes in the Tatar ASSR, by A. A. Troitskaya. Technique of catching fox-cubs, by Yu. A. Gerasimoff. Tagging foxes, by A. F. Tchirkova.

CATS

Precht, H., and E. Lindenlaub. ÜBER DAS HEIMFINDERMÖGEN VON SÄUGETIEREN. I. VERSUCHE AN KÄTZEN. Z. Tierpsych. 11(3): 485-494. 1954. [From J. Mamm. 39(2).] English summary.

Robinson, Weldon B., and Eugene F. Grand. (US F&WS, Denver 2, Colo.) COMPARATIVE MOVEMENTS OF BOBCATS AND COYOTES AS DISCLOSED BY TAGGING. J. Wildl. Mgt. 22(2): 117-122, 2 graphs. Apr. 1958.

Eighty-one bobcats were tagged in Mont., 1954-57. There were 48 recoveries: 17 within 1 airline mi. of release points; 38 within 5 mi.; 44 within 10 mi.; and the maximum movement was 23 mi. In previous studies in which 616 coyotes were tagged, there were 301 comparable recoveries. Mean recovery distance was 14.2 mi., as compared to 4.1 mi. for bobcats; median distances were 5 and 2 mi., respectively. Maximum coyote movement was 115 miles. One out of 5 coyotes traveled farther than the most nomadic cat. The data have important application in control work.--W. B. Robinson.

BIG GAME, GENERAL

Altmann, Margaret. (U. Colo., Boulder.) THE FLIGHT DISTANCE IN FREE-RANGING BIG GAME. J. Wildl. Mgt. 22(2): 207-209. Apr. 1958.

The concept of "flight distance" as a quantitative measure of reactivity of game animals to intruding persons is examined. Variability of flight distance by type of habitat, by individual and group experience, by social, reproductive, and nutritional states is discussed. It is concluded that many aspects of animal behavior can be classified and compared under a discriminating application of the concept.--Author.

Benson, Denis Andrew. NOVA SCOTIA MOOSE STUDIES. M. S. thesis, U. Maine. xii + 242 p. June 1955. [Copy in US Dept. Int. Library.]

Study of "moose sickness."

Branch of Wildlife Research. BIG GAME INVENTORY FOR 1956. US F&WS, Wildl. Leafl. 395. 3 p. Mar. 1958.

Tables show estimated populations and kills of each type of big game in each U. S. state. Wild turkey is included, but only 2 exotics: wild boar and Barbary sheep. "The species listed are free ranging and do not include those of National parks or wildlife refuges." With this restriction, we have only about 575 grizzlies, 110 caribou, and 416 bison. On the other hand, we have about 13,000 moose, 248,000 elk, 117,000 black bears, 419,000 wild turkeys, 113,000 javelina, 15,000 bighorns, 12,000 mtn. goats, and 254,000 pronghorns. Deer, of course, top the list, with 4,659,000 whitetails, 2,811,000 mule deer, and 955,000 blacktails.

Brttt, E. STUDIES OF THE FLUCTUATING INTENSITY OF CROP DAMAGE BY BIG GAME. Z. Jagdwissensch. 3(1): 32-39, 2 graphs. 1957.
In German. Crop damage by red deer, fallow deer, and wild boars shows seasonal variations. Wild boars cause most damage between April and May and during the winter to rye fields which contain potatoes from the previous season. Red deer and fallow deer cause most damage in grain fields from May until Oct., when rutting season begins. Winter damage is unknown.--Vagn F. Flyger.

DESERT BIGHORN SHEEP COUNCIL, FIRST ANNUAL MEETING, SEPT. 23-25, 1957. ii + 98 p., mimeo. 1958. $2.00, paper, from Fred L. Jones, Calif. Dept. Fish & Game, 722 Capitol Ave., Sacramento 14, Calif.
Experts on the desert bighorn came together from several states and 2 federal agencies to discuss their findings and problems. Ten of their papers tell of the status, distribution, numbers, and management of bighorns in N. M., Ariz., Calif., Nev., Grand Canyon Natl. Park, San Andres Natl. Monument, Death Valley, Kofa and Cabeza Prieta Game Ranges, and Desert Game Range. Other papers take up the Natl. Park program in relation to bighorns, and "Disease and mechanical injury." Later sections report group discussions of the following topics: Predation, Seasonal water requirements, Prolonged breeding and lambing period, Lamb survival and herd composition, Seasonal food requirements and nutrition, Territory of individuals and bands, Burro-bighorn competition and control, Hunting, Censusing techniques, and Sign reading. In all, this compendium of information and informed opinion on the desert bighorn should be of value to anyone concerned with the biology and management of the animal.

Eiberle, K. (Eidgen. Tech. Hochschule, Zürich.) RELATION BETWEEN DENSITY OF STOCKING, ANNUAL KILL, AND SEX RATIO WITH ROE DEER. Schweiz. Z. Forstw. 108 (7/8): 457-465. 1957. [From Biol. Abs. 32(3).]
In German. The author concludes that both does and bucks should be shot to maintain a sex ratio of approximately 1:1. This will result in a healthy stock of deer (Capreolus capreolus). A larger proportion of yearling deer should be killed to minimize damage to the forest, forage supply, and to make room for older deer to develop.--W. N. Sparhawk.

Hazzard, Lloyd K. (Colo. Game Dept.) A REVIEW OF LITERATURE ON BIG GAME CENSUS METHODS. Colo. Game & Fish Dept., Fed. Aid Proj. W-38-R-11, Job Completion Rep. iii + 76 p. Apr. 1958.
This useful paper is a commendable time saver. It reviews, with quotations and digests, a great number of census methods that have been used for big game. Emphasis is on Am. work and Am. animals. The author does not present critical appraisals of techniques, but he does note the comments of others and he reproduces formulas that have been proposed. Publications on which the work is based are cited in a 14-p. bibliography.

Householder, Bob. JAVELINA INVENTORY. Ariz. Wildl.-Sportsman 29(4): 24-25, 28-30, 1 photo. Apr. 1958.
The author, a guide of long experience in Ariz., maintains that javelina populations are seriously down all over Ariz., even where not legally hunted. He blames drought and poaching and recommends restricting the take.

Llano, G. A. (Air U., Maxwell Air Force Base, Ala.) UTILIZATION OF LICHENS IN THE ARCTIC AND SUBARCTIC. Econ. Bot. 10(4): 367-392, 7 figs. 1956. [From Biol. Abs. 32(6).]
An analysis of the present economic importance of lichens as grazing for domesticated reindeer in certain polar regions, with reference to their use in industry and sustenance of populations in arctic regions and elsewhere. Topical headings include utilization and related factors, general character of range lands, morphology and reproduction of lichens, growth and ecesis, composition and interspersion of lichens, lichen components and biochemistry, other economic uses of lichens, and conclusions. Bibliography of 62 papers; 6 maps, and 1 figure.--Author.

McKnight, Tom L. (U. Calif., Los Angeles.) THE FERAL BURRO IN THE UNITED STATES: DISTRIBUTION AND PROBLEMS. J. Wildl. Mgt. 22(2): 163-179, 1 map. Apr. 1958.

Results of a detailed mail-questionnaire survey, supplemented by field interviews and observations, indicate that there are between 5,500 and 13,000 feral burros today in w. U. S. They are found in parts of 10 states, with principal concentrations in se. Calif., w. Ariz., and s. Nev. Burros usually inhabit rugged terrain, can subsist on almost any vegetation, will dig deeply for water, and are subject to very little predation. Thus, depletion of range by overuse and deliberate control by man are the principal factors limiting growth of the burro population. Frequently the presence of burros is detrimental to range, water holes, and other herbivorous animals. The major problem is competition for food and water with desert bighorn and with livestock. The writer recommends 9 steps to provide for more satisfactory burro management.--Author.

Morse, Wm. B. (3146 N.E. 10th Ave., Portland 12, Ore.) SUN RIVER MEDICINE. Am. For. 64(4): 24-26, 44, 3 photos. Apr. 1958.

The 20,000-acre Sun River Game Range in Mont. was created on state and federal land to provide winter range for a herd of about 3,000 elk. The herd is said to be worth at least $100,000 a year to the economy of Mont., while total costs of the Game Range have been only about $250,000. The Range has been successful in maintaining the herd, reducing range damage elsewhere, and in protecting ranchers' haystacks. This article tells how the Range was established, how it relates to movements of elk, and the dangers it now faces. One danger, now not immediate, is a proposed dam that would flood calving areas and block migration routes to the Range. A more immediate danger is drilling for oil. Federal lands, all under oil lease, are scattered over the Range. The elk are extremely wild and drilling would virtually drive them from the Range. The author urges the oil companies to refrain from drilling on the area as a good investment in public relations.

Post, George. (Wyo. Game Comm.) THE 5TH SHEEP. Wyo. Wildl. 22(4): 33-39, 2 figs. Apr. 1958.

Eleven bighorns died of a pneumonia-like disease at the Sybille Game & Fish Exp. Unit, Wyo. Post mortem findings are described. Laboratory studies demonstrated that cause was an unknown, perhaps new, bacterium of Pasteurella group. A special vaccine was prepared and apparently gave good protection; commercial pasteurellosis vaccine did not. Post stresses the facts that bighorns are susceptible to respiratory infections and that such diseases will spread easily when bighorns are moderately crowded. Bighorns used for restocking should be vigorous and disease free.

Schorger, A. W. (U. Wis., Madison.) THE MOOSE IN EARLY WISCONSIN. Trans. Wis. Acad. Sci., Arts and Lett. 45: 1-10, illus. 1957. [From Biol. Abs. 32(3).]

Moose, (Alces alces) formerly occurred in Wis. The Wis. race probably was A. a. andersoni, but there is insufficient material to prove this. Most of the records are from the ne. part of the state. It probably became extinct in Wis. about 1900. Sixty reliable records are cited and mapped.--W. Churchill.

Walker, J. Herbert. PENNSYLVANIA'S THUNDERING HERDS. Pa. Game News 29(7): 22-29, illus. July 1958.

History of bison in Pa.

DEER (Odocoileus)

Barick, Frank B. (N. C. Wildl. Resources Comm.) A STUDY IN DEER PRODUCTIVITY. Wildl. in N. C. 22(6): 6-10, 6 figs. June 1958.

Deer of the 13,000-acre Uwharrie Management Area in Montgomery Co., N. C., have overbrowsed their range and have created browse lines on many kinds of plants, including honeysuckle. Fluctuations of the herd since 1954 are graphed. The early spring population has ranged from about 2000 in 1954 down to about 11 in 1957, or from 6 to 11 acres per deer. Numbers have been bolstered by 120 acres of permanent pasture, which is closely utilized. Most browse is out of

reach. Deer have starved and reproduction is low: examination of ovaries showed reproductive rate of 1.25 fawns per adult doe, 1.0 fawn per yearling doe, and 0.16 fawn per fawn doe. Legal kill has av. 7.7% of spring populations. Obviously this is not enough. Heavier harvests, including both sexes, would help herd. Logging to create more browse is also needed.

Bischoff, Arthur I. (Calif. Dept. Game.) PRODUCTIVITY IN SOME CALIFORNIA DEER HERDS. Calif. Fish & Game 44(3): 253-259. July 1958.

Summary: "Reproductive data was taken from 322 adult does, 31 yearling, and 20 female fawns from 11 California deer herds representing five subspecies of deer. With one exception all data on each herd were collected during a single year. Variations in productivity were found in the five subspecies studied, and in different herds of the same subspecies; and no comparison could be made of changes that might have been occurring over successive years. The one herd which was studied for more than a single year did show some differences in productivity. Although some ovarian activity was found in fawns, no evidence of ovulation was found. Yearlings were found to be breeding three to four weeks later than the adults. With the exception of the Camp Pendleton southern mule deer herd the occurrence of fetal abnormalities in California deer is low."

Burcalow, Donald W., and W. H. Marshall. (Minn. Dept. Cons., St. Paul.) DEER NUMBERS, KILL, AND RECREATIONAL USE ON AN INTENSIVELY MANAGED FOREST. J. Wildl. Mgt. 22(2): 141-148, 2 maps. Apr. 1958.

Soils, cover types, fire and logging history of the 3,300 acre Cloquet Exp. For. in ne. Minn. are discussed. Information is presented on deer herd, browse condition, and damage to forest reproduction when the area was a refuge (1923-1945). From 1947 to 1956, nine firearms seasons have been held and the damage problem has been alleviated. Annual censuses and hunter checks show that: (1) Spring deer populations have been 10 deer per sq. mi. The herd is highly productive at this level. (2) Each fall an estimated 3 deer per sq. mi. have been killed. (3) Hunter use has been 90 hunting days per sq. mi. Significance of these data to forest and wildlife management is discussed.--W. H. Marshall.

Christensen, John F., John W. Osebold, and Merton N. Rosen. (Sch. Vet. Med., U. Calif., Davis.) INFECTION AND ANTIBODY RESPONSE IN DEER EXPERIMENTALLY INFECTED WITH ANAPLASMA MARGINALE FROM BOVINE CARRIERS. J. Am. Vet. Med. Assn. 132(7): 289-292, 1 graph. Apr. 1, 1958.

Summary: "Four adult male Columbian black-tailed deer inoculated subcutaneously with blood from bovine carriers of Anaplasma marginale developed Anaplasma infections that were readily detected by blood smear examination for Anaplasma and by rise in complement-fixation titers. Three of the infections were inapparent clinically, while 1 deer demonstrated moderately severe anaplasmosis characterized by anemia and weakness. Blood from 2 of these deer, taken after the appearance of Anaplasma in the red blood cells, produced acute, fatal anaplasmosis after inoculation into 2 splenectomized calves. The antibody responses to these infections in the deer were marked, with complement-fixation titers rising sharply by the time Anaplasma appeared in the red blood cells and remaining high until the decline of Anaplasma. Attention is called to the possibility of transmission of A. marginale infection between cattle and deer on ranges occupied by these animals and vector ticks."

Dasmann, Wm. P., Henry A. Hjersman, and Daly Gilsenan. (Calif. Dept. Game.) CALIFORNIA'S FIRST GENERAL EITHER-SEX DEER HUNTING SEASON. Calif. Fish & Game 44(3): 231-251, 1 map. July 1958.

In 1956 Calif. had either-sex deer hunting in 34 of its 58 counties. This paper reports the events that led up to either-sex shooting, gives a breakdown of the kill by regions, considers problems that arose in connection with the hunt, and evaluates the effect of either-sex shooting on the kill of bucks the following year. Kill of antlerless deer was 46% of total kill in the counties involved. Concentrations of hunters caused protests in certain regions. Public outcry against shooting does and fawns was so great that the legislature banned any more general either-sex hunts and stipulated that further either-sex shooting must be done on a unit-quota basis. The 1957 hunting season did not bear out fears of the public: kill of bucks was close to its 1952-56 average. Equally significant, fawn production and survival have been very high.

Eberhardt, Lee. (Mich. Dept. Cons., Lansing.) DEER IN 1957 / SIGNIFICANCE OF RECENT INFORMATION. Mich. Dept. Cons., Game Div., Info. Cir. 109. 21 p., illus. Aug. 1957.

A synopsis of facts and figures about dynamics of the Mich. herd, and about hunters' opinion of special seasons. It takes up: size of kills in regions of the state, 1952-56, in regular seasons; size of kills and hunter success in special seasons; results of surveys of winter-killed deer; population trends, 1932-56; estimates of spring deer populations in regions of state, 1953-57; proportion of bucks in the 1.5-year class, 1952-56; condition of herds of regions of state as shown by antler development, 1951-56; ability of the deer population to recover rapidly after winter kills and special seasons; dependence of population level on level of fawn production; and dependence of fawn production on food conditions, which, in overpopulated areas, depends on hunter kill and winter kill. One of the main points of the paper is that special seasons have not caused decline of herds. The last part of the paper reports surveys of hunter's opinions on need for special seasons, and on whether special seasons should be concurrent with or subsequent to regular seasons. A very thin majority of hunters saw a need for special seasons. A slightly larger majority preferred concurrent to subsequent seasons.

Flyger, V. F. THE STATUS OF WHITE-TAILED DEER IN MARYLAND, 1956. Md. Dept. Res. & Ed. (Solomons), Resource Study Rep. no. 13. 1-9 p., 5 figs. Mar. 1958.

This paper presents figures on annual legal kill, by counties, 1931-56; on av. weights, by region and age; and on age composition of the kill in 5 areas of Md. in 1956. The statewide kill has increased from 56 in 1931 to 4084 in 1956. Only at Aberdeen Proving Ground is there evidence of overpopulation in the form of numerous old deer, low weights, and die-offs. Other herds are still growing healthily, but at the rate some of them are growing, problems will arise in the near future. What should be done to anticipate trouble? Limited shooting of ♀♀ clearly is the answer, and the need of this is explained. Studies are under way to determine where increased kill is needed and how large it should be.

Goins, W. C. THE TENSAS DEER PICTURE! La. Cons. 10(3): 14-17, 3 photos. Mar. 1958.

Deer of Tensas Parish, La., became far too numerous for a range that was deteriorating because of clearing for crops, competition with cattle, and growth of trees. Crop damage became so severe that many farmers could no longer stand the financial drain. Hunting of does was illegal, so state agents and farmers staged a control campaign early in 1958. 134 deer were examined by biologists. In the fawn class, there were 3 ♀♀ to 1 ♂. In all, 105 deer were ♀♀ and 28 were ♂♂. "Of the 105 females, 44 were fawns, 16 were yearlings and 45 were adults. Of the 28 males, 15 were fawns, three were yearlings, six were adults and four were not aged. The average weight of the female yearlings was 96.6 lbs.; that of the female adults was 123.2 lbs., and that of the female fawns was 55.9 lbs. The average of the male fawns was 62.3 lbs. These figures plainly indicate that these deer were considerably undersize although they were, in most instances, reported to be fat." Mature deer were heavily parasitized by liver flukes. Only about half of the ♀♀ were bred. Crop plants and weeds dominated stomach contents. There was little sign of deer away from fields. The only long-term solution for the problem is for the state commission to be given authority to permit either-sex shooting where needed.

Helmboldt, C. F., and R. D. McDowell. (U. Conn., Storrs.) GRANULAR VENEREAL DISEASE IN A WHITE-TAILED DEER. J. Wildl. Mgt. 22(2): 203-204, 2 photos. Apr. 1958.

Granular venereal disease was diagnosed by histological means in a 20 mos.-old deer from Conn. The lesion resembled those seen in domestic cattle.--C. F. Helmboldt.

Hughes, Eric, and Rolf Mall. (Humboldt State Coll., Arcata, Calif.) RELATION OF THE ADRENAL CORTEX TO CONDITION OF DEER. Calif. Fish & Game 44(2): 191-196. Apr. 1958.

Summary: "It was surmised originally that a sample of a restricted population of deer would show uniform condition. The results could then be used for comparison with other populations. The actual variations observed in condition factors (primarily body weight and kidney fat), however, lead to a contrary hypothesis; namely, that there was a significant difference among individuals in

the sample. The onset of the fall molt seemed to have no correlation with condition in this sample. The lack of correlation between these condition factors and body length (here assumed to be the most valid, condition-independent body measurement) added emphasis to the latter assumption. Adrenal hypertrophy and hyperplasia are generally accepted as being a reaction of the body to stressors. The significant negative correlations between the amount of adrenal cortical tissue and the condition factors indicate that Selye's General Adaptation Syndrome was the mechanism affecting these variations in adrenal size. It is concluded that in the deer sampled adrenal cortical size, most easily measured as adrenal weight, may be considered as a condition factor with regard to the field condition determinants presently in use."

Jackson, C. F. (Prof. Emeritus, U. of N. H.) SUGGESTED METHODS FOR IDENTIFYING THE MEAT OF THE WHITE-TAILED DEER. N. H. Fish & Game Dept., Tech. Cir. no. 16. ii + 9 p., 6 col. photos, 1 fig. 1958.

Cooked or raw venison can be distinguished from flesh of livestock by: "1. Determining the amount of hemoglobin-like pigments in the unknown meat in comparison with pigments from known sources. 2. Determining the amount of fat occurring between the muscle cells. 3. Extracting and crystallizing the muscle protein; the crystals from venison usually being easily recognized." Apparently these methods are relatively simple and practicable.

Jordan, Peter A. (MVZ, U. Calif., Berkeley.) MARKING DEER WITH BELLS. Calif. Fish & Game 44(2): 183-189, 1 fig. Apr. 1958.

Ten sizes of sheep and turkey bells were used. Each had a different tone. Different types were used on bucks, does, and fawns. They were audible at 50 to 800 yards. Bell bore same design as ear tag used on same individual. Application of bells is discussed; precautions are especially necessary in adapting collars for young. Summary: "During the winters of 1955-56 and 1956-57, on a winter range northwest of the San Joaquin River in California, 260 deer were belled and marked for individual recognition. Deer adjusted to the belling with no apparent effect on their condition or behavior. The danger exists that a deer may put its foreleg inside the strap or chain holding the bell if excessive slack is allowed. A weak link or nonpermanent holding device should be used if slack must be allowed for growth. Belling of deer increased subsequent location and individual identification success as much as 41 times over marking only with ear tags. Deer so marked may be located in heavy brush, can be followed when in flight, and can be studied by sounds even when not visible. On the other hand, using belled deer in Lincoln Index calculations may give invalid results because of the biasing effect of bells on observers or hunters."

Krefting, L. W., and H. L. Hansen. (US F&WS, U. Minn. Sch. For., St. Paul 1, Minn.) COMPARISON OF WINTER AND SPRING APPLICATIONS OF 2,4-D TO INDUCE REGROWTH OF MOUNTAIN MAPLE FOR DEER BROWSE. Minn. For. Notes (U. Minn.) no. 66. 2 p. Apr. 1958.

Results are better with spraying at time of bud swelling in spring. Winter applications cause more mortality and less regrowth as measured by number of sprouts and height of sprouts.

Magruder, N. D., C. E. French, L. C. McEwen, and R. W. Swift. (Pa. State U., U. Park.) NUTRITIONAL REQUIREMENTS OF WHITE-TAILED DEER FOR GROWTh AND ANTLER DEVELOPMENT II. / EXPERIMENTAL RESULTS OF THE THIRD YEAR. Pa. State U., Agr. Exp. Sta., Bul. 628. 21 p., 21 figs. Dec. 1957.

Reports results of 3d and final year, in which some deer were shifted from complete to deficient rations. The annual weight cycle was again evident. Deer required a little less good dry food (3.5 lbs.) to gain weight slowly in their 3d year than did 2-year-olds (4 lbs.). A slight decrease in protein content of food caused loss of body and antler weight. Deer on this restricted ration for 3 years gained little in 3d year. Young deer needed 13-16% protein for optimum growth of body and antlers. Three-year-olds could produce branched antlers at protein level of 7.3%. Requirements for Ca and P were interrelated, one tending to compensate for shortage of the other. Deer developed branched antlers at 2.5 and 3.5 years on diet of 0.09% Ca and 0.6% P. On much less Ca and P, deer died or were stunted in body and antler growth. Best antler growth was attained on dietary level of 0.64% Ca and 0.56% P. Deer shifted from complete to restricted rations had smaller and lighter antlers than they had the

year before. In short, well-fed adult deer decreased in body weight and antler size when on restricted rations for a year. Deer reared on poor rations for 3 years were stunted and produced thin spike antlers. "Deer consuming the best of feeds during the fattening and antler growth period, April to September, produced large 'racks' and optimum weight gains. These deer also survived better the periods of rut and late winter weight loss."

Merrill, Leo B., committee chairman. (Texas Agr. Exp. Sta.) LIVESTOCK AND DEER RATIOS FOR TEXAS RANGE LANDS. Texas Agr. Exp. Sta. (Coll. Sta.), MP-221. 1-9 p., 13 figs. Aug. 1957.

Important committee report based on much research. From summary: "Information from recent grazing experiments in Texas has indicated that the animal unit standards now used may need to be altered. Conclusions reported...are based on long-time effects of livestock and deer on the basic forage and soil resources... The following recommendations are based on information obtained from studies and field surveys: 1. Where the vegetation is suitable, mixed classes of livestock should be grazed for the most desirable utilization of range forage. Pastures stocked at moderate rates with combinations of livestock show more uniform utilization of the area and better use of a wider variety of forage species. 2. The following equivalent values are proposed as animal unit standards for planning and management of grazing lands:" CATTLE. Weaned calves to yearlings, 0.6 animal unit (a.u.). Steers and heifers (1-2 years), 1.0 a.u. Mature cows, 1.0 a.u. Bulls, 1.3 a.u. SHEEP. 5 weaned lambs to yearlings, 0.6 a.u. 5 muttons or ewes (1-2 years), 1.0 a.u. 5 mature ewes, 1.0 a.u. 5 rams, 1.3 a.u. GOATS AND DEER. 6 weaned kids to yearlings, 0.6 a.u. 6 muttons or does (1-2 years), 1.0 a.u. 6 does, 1.0 a.u. 6 bucks or muttons over 2 years, 1.3 a.u. 6 deer, 1.0 a.u. "3. Variations in range site and range condition classes often will result in varying degrees of competition between kinds of livestock and deer. These variations should be considered in the planning and management of range lands. However, the major differences between range sites and range condition classes will be in total carrying capacities rather than in ratios among the various kinds of livestock and deer."

Progulske, Donald R., and Thomas S. Baskett. (S. Dak. State Coll., Brookings.) MOBILITY OF MISSOURI DEER AND THEIR HARASSMENT BY DOGS. J. Wildl. Mgt. 22(2): 184-192, 7 figs. Apr. 1958.

Data on movements of individually marked white-tailed deer in central Mo. were collected from Mar. 1951 to Nov. 1957. Maximum distances moved by 17 ♂♂ averaged 1.9 mi.; for 11 ♀♀ and 3 fawns the av. was 1.4 mi. Averages were based on 194 observations of marked deer, made during all seasons. During spring, summer, and early fall, several deer had small, distinct home ranges of about 1/2 sq. mi. Apparently there was some shifting of ranges in late fall. In winter, tracking showed that an area as large as 2.25 sq. mi. was used by a group of deer. Hounds harassed the deer at all seasons and sometimes drove them long distances; ultimate effects of this steady harassment could not be evaluated. Most of the hounds had local owners. Peaks of deer running correlated with raccoon and fox hunting seasons. Dogs seemingly were negligible causes of direct mortality of deer.--Authors.

Reynolds, Iona Mae, and R. E. Smith. (Mass. Agr. Exp. Sta., Amherst.) SEROLOGICAL SURVEY FOR LEPTOSPIRA POMONA ANTIBODIES IN CATTLE AND DEER IN MASSACHUSETTS. J. Am. Vet. Med. Assn. 132(7): 293-296. Apr. 1, 1958.

None of 628 deer killed during 1956 hunting season showed agglutinating antibodies against L. pomona. 2.6% of cattle were serologically positive.

Rogers, Glenn, Odell Julander, and W. Leslie Robinette. (Colo. Dept. Game, Grand Junction.) PELLET-GROUP COUNTS FOR DEER CENSUS AND RANGE-USE INDEX. J. Wildl. Mgt. 22(2): 193-199. Apr. 1958.

Daily defecation rate for mule deer was studied in typical winter range pastures at Little Hills Exp. Sta., Colo., 1951-55. Pastures were lightly to moderately stocked and deer days of use of each pasture were closely determined. Av. overwinter daily defecation rate was about 15 groups. A lower figure is suggested for depleted ranges. Counts on plots previously cleared of pellets agreed closely with those on uncleared plots. Factors affecting recorded defecation rates and the intensity of sampling needed for use in deer census work are discussed.--Odell Julander.

DEER (Odocoileus)--Continued

Rummell, Robert S. CATTLE STOCKING AND HERBAGE YIELD ON BURNED FLATWOODS RANGES. US For. Serv., SE For. Exp. Sta. (Asheville, N. C.), Res. Notes no. 118. 2 p., 1 graph. May 1958.
Data are based on work at Caloosa Exp. Range, Charlotte Co., Fla.

Stoeckeler, J. H., John M. Keener, and R. O. Strothmann. (Lake States For. Exp. Sta., St. Paul 1, Minn.) DEER BROWSE PRODUCTION FROM FELLED TREES IN THE NORTHERN HARDWOOD-HEMLOCK FOREST TYPE. J. For. 56(6): 416-421, 4 photos, 2 graphs. June 1958.
Detailed quantitative study of amount and cost of browse provided by felling and thinning trees of different species and sizes. Such cuttings afford large amounts of high-grade deer food free of charge when made commercially. When made for deer management, they afford much cheaper food than alfalfa hay and they can provide it just where it is wanted, even where trucks cannot go. "Sustained yield forestry with annual timber cutting on large forest properties is an important factor in the over-winter survival of the deer herd due to supplemental feed provided in the newly felled tops and later in the sprouts and new seedlings stimulated by logging."

Teeri, A. E., W. Virchow, N. F. Colovos, and F. Greeley. (Agr. Exp. Sta., U. New Hampshire, Durham.) BLOOD COMPOSITION OF WHITE-TAILED DEER. J. Mamm. 39(2): 269-274. May 1958.
Summary: "The indications from this study are that malnutrition in male white-tailed deer fawns produced hypoglycemia with a corresponding increase in protein catabolism as reflected by slightly elevated blood urea concentrations. Elevated sedimentation rates, polymorphonuclear leucocytosis, and low levels of inorganic phosphate may also have occurred at some state in malnutrition. There was little evidence of anemia."

Wilber, Charles G., and Paul F. Robinson. (Army Chemical Center, Md.) ASPECTS OF BLOOD CHEMISTRY IN THE WHITE-TAILED DEER. J. Mamm. 39(2): 309-311. May 1958.
Tabulated for 10 adults are data on body temperature, Na, K, Cl, cholesterol, inorganic phosphorus, and total lipids.

MAMMALS--MARINE

Bonner, W. Nigel. (Falkland Islands Depend. Sci. Bur., 11 Cowley St., London, S.W. 1, Eng.) NOTES ON THE SOUTHERN FUR SEAL IN SOUTH GEORGIA. Proc. Zool. Soc. London 130(2): 241-252, 2 figs., 3 pl. Mar. 1958.
Summary: "The occurrence of a colony of [Arctocephalus australis] in South Georgia is recorded and the observed habits and interspecific relationships of the seals described. The colony is estimated to consist of between 8,000 and 12,000 seals, excluding pups. The ratio of harem bulls to breeding cows was found to be 1:8.4. The future prospects of the herd are discussed and it is suggested that expansion and increase in numbers may be expected to take place. The occurrence of fur seals in the South Orkneys is noted." Topics considered include: habitat; behavior of bulls, cows, and pups; food; possibility of competition with elephant seals for breeding beaches. Populations of fur seals have recovered much more slowly than those of elephant seals in the time since commercial sealing ceased in 1906.

Jellison, Wm. L., and Kelsey C. Milner. (Rocky Mtn. Lab., Hamilton, Mont.) SALMONELLOSIS (BACILLARY DYSENTERY) OF FUR SEALS. J. Wildl. Mgt. 22(2): 199-200. Apr. 1958.
Salmonella enteritidis was isolated from blood and viscera of 5 of 12 sick fur-seal pups, Callorhinus ursinus, collected on Pribilofs during late summer of 1951. Lice from one of the pups so examined also harbored S. enteritidis. Salmonellosis may contribute significantly to mortality of seal pups. It is recognized that hookworm disease is the major cause of death among these animals. --W. L. Jellison.

Laws, R. M. (Natl. Inst. Oceanog., Eng.) GROWTH RATES AND AGES OF CRABEATER SEALS, LOBODON CARCINOPHAGUS JACQUINOT & PUCHERAN. Proc. Zool. Soc. London 130 (2): 275-288, 5 figs., 2 pl. Mar. 1958.

Using growth rings in teeth to determine age, Laws drew up a growth curve and determined size and age of ♀♀ at sexual maturity. The samples were too small for mortality rates to be determined, but annual mortality rate appeared to be about 25%. This rate is rather high and may reflect heavy predation by killer whales. The oldest seals in the samples were 19 years old.

Tomilin, A. G. MAMMALS OF USSR AND ADJACENT REGIONS. VOL. IX. CETACEANS. Akad. Nauk SSSR (Moscow). 756 p., 11 pl. 1957. (Continuation of "Mammals of Eastern Europe and Northern Asia" by S. I. Ognev.) [From J. Mamm. 39(2).]

In Russian.

Van Bemmel, A. C. V. THE COMMON SEAL IN THE NETHERLANDS. Levende Natuur 59(1): 1-12, illus. 1956. [From Biol. Abs. 32(6).]

In Dutch. The biology of Phoca vitulina, the largest really wild mammal of the Netherlands, is still imperfectly known. This is partly due to the fact that the young are born in the intertidal zone and have to start swimming when only a few hours old. The mother follows the newly born young in the water. When twins are born (some 10% of the births) the mother finds it impossible to follow both cubs simultaneously. Therefore many a cub gets lost and perishes. The seals perform seasonal migrations in the Dutch coastal waters. In spring the females migrate further inshore, to give birth to their cubs in sheltered areas in early summer. Late in summer the young ones migrate to areas closer to the North Sea, and the adult males migrate inwards at the beginning of the mating season. Later in the year both males and females migrate to the outlying area for winter. Some 1000 seals live in the Zealand waters, about 1200 in the Waddensea. High fur prices led to increased shooting: in recent years some 800 to 1200 seals are killed annually. This led to a decrease of the stock in Zealand, but in the Waddensea the strength of the herds remained remarkably constant. The author explains this in terms of immigration from the German Waddensea, where no increase of the herds is observed, though only some 7% per year is killed there by seal hunters.--P. Korringa.

MAMMALS--OTHER GROUPS

Babero, Bert. (U. of Ill., Urbana.) SOME HELMINTHS FROM ILLINOIS OPOSSUMS. J. Parasit. 43(2): 232. Apr. 1957.

Two individuals proved to contain 9 genera and 10 species of worms.

Hamilton, Wm. J., Jr. (Cornell U., Ithaca, N. Y.) LIFE HISTORY AND ECONOMIC RELATIONS OF THE OPOSSUM (DIDELPHIS MARSUPIALIS VIRGINIANA) IN NEW YORK STATE. Cornell U., Agr. Exp. Sta., Mem. 354. 1-48 p., 12 figs. Mar. 1958.

Summary: "This study of the opossum in New York State, where it has spread markedly northward, is based on 25 years of observation. Weights and measurements are provided for 300 specimens. The northward spread of the opossum in New York is recorded over the past 25 years. Analyses of the stomachs of 461 specimens taken throughout the year indicate that the primary food of the opossum consists of insects, mammals, green vegetation, fruits, earthworms, and amphibians. These constitute approximately 72.5 per cent of the volume. Other foods include birds, molluscs, reptiles, carrion, grass, and small invertebrates. The opossum produces 2 litters a year in New York. The average number in 346 pouch litters available in this study was 8.66, a somewhat higher number than those recorded elsewhere. Shortly after weaning, young of the second litter can utilize the swollen teat without delay. Approximately 30 per cent of the females taken from March through August were barren. The loss by predation is of no consequence. Parasites, both ectoparasites and endoparasites, are listed. Of the former, 9 have been recovered from New York individuals. Endoparasites include 12 intestinal parasites. The economic relationship between the opossum and man is discussed. From a study of the food, the opossum appears to have little importance as a predator of poultry and game species. It may feed on nestling rabbits upon occasion and kills some birds. This study indicates that the opossum is of minor economic significance to wildlife and small domestic livestock in New York State."

BIRDS--GENERAL

Greenway, James C., Jr. EXTINCT AND VANISHING BIRDS OF THE WORLD. Am. Committee for Internatl. Wild Life Protection (N. Y. Zool. Park, N. Y. 60, N. Y.) Spec. Publ. no. 13. x + 518 p., 86 figs. 1958. $5.00. [From Outdoor News Bul. 12(6).]

"This is a compilation of the birds known and thought to be extinct as well as those that are threatened with extinction. 'In order to try to avoid the total disappearance of the threatened species,' writes Jean Delacour...in the foreward, ' a thorough study of the extinct and nearly extinct ones is a first necessity. No modern and comprehensive work of this kind was so far available, and Mr. Greenway's book fills a regrettable gap.' Beginning with a summation of those species and subspecies of birds known to be extinct, thought probably extinct, known only from osseous remains, known only from pictures and descriptions, small populations of certain species, and some rare birds probably not now in danger, the author continues with a discussion of the geography of extinction. Occupying a major part of the book are the accounts of extinct and vanishing forms. Each bird is discussed individually and as complete as possible account given of the status of each, known range, habitat, habits, and location of specimens."

Hopkins, Milton N., Jr. (202 W. Roanoke Dr., Fitzgerald, Ga.) LAND USAGE AND BIRDS. Oriole 23(1): 1-2. Mar. 1958.

There are more than 30,000 farm ponds in Ga. and they are increasing at rate of 250 a month. Where shorebirds formerly were seldom seen, it is now not uncommon to see at least 5 species a day on many of the ponds. Wood ducks often use the ponds in early morning and late afternoon. Several species of ducks apparently winter on ponds where there is no shooting. Prothonotary warblers nest at ponds that have dead stubs. Wood thrushes breed along pond outlets. Several other aquatic or semi-aquatic birds, but no rails, are also seen at ponds. Increase of pastures has led to influx of western birds such as horned lark. Increase of pine plantations has caused departure of many previously resident birds; the pine plantations are usually barren grounds for birding.

McAtee, W. L. FOLK-NAMES OF CANADIAN BIRDS. Natl. Mus. Canada (Ottawa), Bul. no. 149. iii + 74 p. 1957. 25¢.

This may be the best available reference on vernacular names of our birds, for it covers a large proportion of all N. Am. birds, is well printed, and is low priced. It gives all known names used by people of European origin, explains their meaning where possible, and tells where they have been used. Eskimo and Indian names are excluded unless adopted by whites. Has index and list of references.

Sladen, W. J. L., and W. L. N. Tickell. (Falkland Is. Depend. Surv., 11 Cowley St., London, S.W. 1, Eng.) ANTARCTIC BIRD-BANDING BY THE FALKLAND ISLANDS DEPENDENCIES SURVEY, 1945-1957. Bird-Banding 29(1): 1-26, 3 figs. Jan. 1958.

Major article that gives much information on techniques of banding and otherwise studying penguins and other Antarctic birds and summarizes results to date for many species. Should be seen by anyone concerned with field study of Arctic or Antarctic birds.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Hartshorne, Charles. (Emory U., Atlanta, Ga.) SOME BIOLOGICAL PRINCIPLES APPLICABLE TO SONG-BEHAVIOR. Wilson Bul. 70(1): 41-56. Mar. 1958.

Hoffman, Klaus. (Max-Planck-Inst., Wilhelmshaven, Germany.) REPETITION OF AN EXPERIMENT ON BIRD ORIENTATION. Nature 181(4621): 1435-1437, 3 figs. May 24, 1958.

The sun-navigation theory of Matthews was supported in part by Matthews' sun occlusion experiment. The same type of experiment in Germany gave different results. The author then repeated the experiment in England, with care to eliminate possible genetic differences. Results were again negative and did not support the sun navigation theory.

Kramer, Gustav. (Max-Planck Inst. Meeresbiol., (23) Wilhelmshaven, Germany.) THE INFLUENCE OF TEMPERATURE AND EXPERIENCE ON THE HOMING ABILITY OF HOMING PIGEONS. J. Ornith. 95(3/4): 343-347. 1954. [From abstract by D. S. Farner, Bird-Banding 29(1).]

In German. "Homing performance was definitely poorer in cold weather."

Mathiasson, Sven. THE AUTUMN MIGRATION AT FALSTERBO 1952. REPORT NO. 9 OF THE FALSTERBO BIRD STATION. Vår Fågelvärld 16: 90-104. 1957. [From review by Louise deK. Lawrence, Bird-Banding 29(1).]

Has English summary. Based on detailed observation of 135 species, mostly small birds. "A comparison between the concurrent observations made at Ottenby and Falsterbo and of the weather conditions at the time of the three peak dates in July, August, and September revealed among other things the following: 1) the advance of cold air in the fall is a migration releaser, and when this air spread over an extensive area it gave rise to heavy migratory movement over a wide front; 2) for more than 10 days strong easterly to northeasterly as well as strong westerly winds inhibited the southward movement of great numbers of migrants, but immediately these conditions changed, they moved forth as if in an avalanche."

Mewaldt, L. Richard. (San Jose State Coll., San Jose, Calif.) PTERYLOGRAPHY AND NATURAL AND EXPERIMENTALLY INDUCED MOLT IN CLARK'S NUTCRACKER. Condor 60 (3): 165-187, 7 figs. May-June 1958.

Detailed research report. Includes much information on differences between first-year and adult birds.

Rautenberg, Werner. COMPARATIVE INVESTIGATIONS OF THE ENERGY ECONOMY OF BRAMBLINGS AND HOUSE SPARROWS. J. Ornith. 98(1): 36-64. 1957. [From long review by James R. King, Bird-Banding 29(1).]

In German. "This investigation contributes to a definition of the energetic and regulatory basis for the premigratory accumulation of large amounts of depot fat in Fringilla montifringilla and, secondarily, the reasons for the absence of a similar biennial accumulation in the nonmigratory Passer domesticus. Premigratory fat deposition and the ability to mobilize these reserves rapidly are regarded as major characteristics of the physiologic preparation for migration..." King's analytical review is over 3 pages long and should be seen by anyone concerned with the subject.

Sauer, Franz. ORIENTATION BY THE STARS OF WARBLERS MIGRATING BY NIGHT. Z. Tierpsych. 14(1): 29-70. 1957. [From long abstract by M. M. Nice, Bird-Banding 29(1).]

In German with English summary. Convincing experimental evidence that 3 species of Sylvia are able to orient themselves by observation of stars at night. These birds "possess a mechanism of migration orientation which enables them, independently of local topography and of their individual experience, to determine, with the help of their ability to assess time, their specific course of migration while steering by the starlit sky. For the functioning of the mechanism, it is sufficient that the bird is able to see sections of the starry sky. Azimuth and the declination of the star pattern are important for the functioning of the migration orientation by astronavigation." Most of the experimental birds had been reared indoors from the age of 9 days and had never before seen the sky.

Sieh, James G. (Iowa Cons. Comm., Spirit Lake.) THE FORECAST AND ADVENT OF MASS MIGRATION OF WATERFOWL THROUGH IOWA IN THE FALL OF 1957. Iowa Bird Life 28(1): 2-4. Mar. 1958.

At least twice in the fall of 1957, major flights were successfully predicted at times when cold fronts brought snow and cold to Canada and north winds blew from the Prairie Provinces into the Central States.

Tabor, Teresa. THE INFLUENCE OF TEMPERATURE ON ACTIVITY IN THE COMMON BUZZARD (BUTEO BUTEO L.) AND THE ROUGH-LEGGED BUZZARD (BUTEO LAGOPUS L.). Folia Biol. 4(3/4): 327-330. 1956. [From Biol. Abs. 32(6).]

In Polish with English summ. Influence of temperature on activity in the common buzzard (Buteo buteo L.) and rough-legged buzzard (B. lagopus L.) was investigated. The common buzzard was kept in air temperatures of 8.4°C and 19°C and rough-legged buzzard in temperatures of 14.3°C and 24.6°C. In lower temperatures, birds exhibited normal activity, i.e. a high degree in daylight and a

low degree in darkness. As temperature rose, activity decreased during day but increased at night, so at highest temperature investigated, (24.6°C), nocturnal activity was greater than diurnal.--Auth. summ.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Bee, James W. BIRDS FOUND ON THE ARCTIC SLOPE OF NORTHERN ALASKA. U. Kans. Publ., Mus. Nat. Hist., 10(5): 163-211, 2 pl., 1 fig. Mar. 1958.
Annotated list of 73 species. Many of the species are treated at length, with notes on numbers, weights, reproductive condition, nests, habitats, and behavior.

Behle, Wm. H. (U. Utah.) THE BIRD LIFE OF GREAT SALT LAKE. U. Utah Press. xiii + 203 p., 43 figs. 1958. $4.50, cloth.
"The Life History, Ecology and Population Trends of the California Gulls, White Pelicans, Double-crested Cormorants and Great Blue Herons, Together with an Account of the Bear River Migratory Bird Refuge." Behle's book is a mine of information on the birds named. It includes, for example, an excellent account of the plumage cycle and changes in coloration of soft parts of the California gull. It also provides an annotated list of all birds of the lake and a long account of Bear River Refuge and work that has been done there. In all, the book is a valuable contribution based on continuous observations at least since 1932. Great Salt Lake is an important breeding area for several species of colonial-nesting birds, and one of the few in the country for white pelicans. Islands apparently are selected for nesting because of protection they afford. There are no fish in the lake and the birds must make a round trip of 50-100 miles for food. Some islands have already been deserted for nesting, and it is possible that others will also be deserted owing to increased human activity on the lake. Bear River Refuge benefits some of the birds. Herons and cormorants are now nesting there; others may follow.--Brooke Meanley.

Burleigh, Thomas D. GEORGIA BIRDS. U. Okla. Press, Norman. xxix + 746 p., 35 col. pl., 13 photos, 12 distribution maps, 3 figs. 1958. $12.50.
Impressive in scope and format, this subsidized work includes 35 paintings by C. M. Sutton, a chapter "History of Ornithology in Georgia" by Wm. W. Griffin, and a discussion of the "Physiographic and Biogeographic Regions of Georgia" by Robert A. Norris. There are also a 27 p. bibliography, a hypothetical list, a list of birds first described from Georgia, and an index. Accounts of the 440 accepted species and subspecies treat general distribution, status in Georgia, and habits and recognition. Some species have been given special treatment; Stoddard's account of Bachman's sparrow is especially interesting. The book is a useful and authoritative reference, but it could have been improved by more data, and habitat photos, for the Piedmont and Mountain Provinces. Also, subspecies might well have been subordinated to species instead of being given separate accounts. Names and ranges were taken, with modifications, from the 1931 A.O.U. Check-list. Some of the common names are unnecessarily cumbersome. Sutton's 35 paintings add much to the book. Each shows 1 species in a natural habitat. The results are pleasing and effective, but occasionally plumage colors are a little pale and some of the birds are a little stiff. Colors of the crossvine flower (in brown thrasher painting) are not accurate. Georgia has at least 2 outstanding bird artists in residence; examples of their work would have been appropriate in this book. Although we have criticized various things in this volume, we should emphasize the fact that it is a fine contribution--a publication that will be desired by every serious ornithologist, especially in the Southeast.--Brooke Meanley.

Gizenko, A. I. BIRDS OF SAKHALIN OBLAST'. Moscow. 328 p., 73 figs. 1955. [From review by D. G. Nichols, Auk 75(2).]
Useful work on avifauna of Sakhalin and Kurile Islands. It treats distribution and natural history of 339 forms. Data on migration routes and schedules are given for most species. Food habits data are provided for many species. Much information is included on the extensive colonies of alcids, gulls, and cormorants. These colonies are heavily exploited for commercial purposes: a single colony yields up to 100,000 eggs and 10,000 bird carcasses. "Interesting statistical data are given on relative weights, measurements, and chemical composition of the different elements of alcid eggs. Suggestions are included for

the control of the bird harvest to the end that the size of the colony will not be affected." Commercial exploitation of birds is widespread in the USSR. It is, however, said to be carried on under the supervision of trained ornithologists who presumably can prevent it from going too far.

Godfrey, W. Earl. (Natl. Mus. Can., Ottawa.) BIRDS OF CAPE BRETON ISLAND, NOVA SCOTIA. Can. Field-Nat. 72(1): 7-27. Jan.-Mar. 1958.
Annotated list with data on status, seasonal occurrence, and occasional natural history notes.

Howell, J. C., and M. B. Monroe. (U. Tenn., Knoxville.) THE BIRDS OF KNOX COUNTY, TENNESSEE. J. Tenn. Acad. Sci. 32(4): 247-322. 1957. [From Biol. Abs. 32(6).]
For 130 spp. there are tables providing information as to the number of individuals observed during each month or period of occurrence. Tables giving numbers of individuals heard singing during each month are included for 46 spp. Earliest arrival and latest departure dates are given for those migrating spp. which are of regular occurrence, and av. dates of arrival and departure are given for spp. for which there were sufficient data. Information about reproduction is presented for a number of spp.--J. C. Howell.

Kessel, Brina, and Tom J. Cade. (U. of Alaska, College.) BIRDS OF THE COLVILLE RIVER, NORTHERN ALASKA. Biol. Pap. U. Alaska no. 2. 75 p. April 1958.
This paper reports on 87 species of birds that have been recorded along the 400-mile Colville R. It is based primarily on observations made during 2.5 months of field work in summer of 1952, but includes data from 1956 and 1957 as well as material from the literature and from unpublished observations of other investigators. Where possible, the annotated list includes observations on distribution, abundance, migration, breeding, and food habits of the species. Eleven major avian habitats are recognized in the region: Sedge-grass Marsh; Tussock-heath Tundra; Dwarf Shrub; Tall Brush; Tundra-Lacustrine Water Edge; Dry Tundra; Bluffs, Slides, and Outcrops; Alluvial Deposits; Riparian Cut Banks; Fluviatile Waters; and Lacustrine Waters. Analysis of the geographical distribution of breeding birds within the tundra biome of the Arctic Slope of Alaska shows 3 major avifaunal divisions. These correspond closely to the 3 physiographic provinces recognized by geologists: Brooks Range Province, Arctic Foothills Province, and Arctic Coastal Plain Province.--Authors.

Manning, T. H., E. O. Höhn, and A. H. Macpherson. THE BIRDS OF BANKS ISLAND. Natl. Mus. Canada, Bul. no. 143. 143 p., 12 photos, map. 1956. $2.50. [From review by E. Eisermann, Auk 75(2).]
"Banks Island is an arctic island in north-western Canada with an area of 24,600 miles, all above tree-line. This paper is based on the field work of the authors, chiefly in 1952 and 1953, the reports of other observers, and a study of the arctic bird collections in the National Museum of Canada. It is much more than the usual annotated faunal list. In addition to local status, with definite estimates of numbers, and data on breeding, habitat, and behavior, we are given a wealth of information as to status in other parts of arctic Canada and very full literature references." There are also detailed taxonomic discussions of relationships of certain boreal forms. These are supported by statistical tables or photographs. Blue and snow geese are treated as subspecies of the same species. The black brant is held to be a subspecies of Branta bernicla. Taxonomy of gyrfalcon, peregrine falcon, and various gulls is also considered.

Miller, Alden H., Herbert Friedmann, Ludlow Griscom, and Robert T. Moore. DISTRIBUTIONAL CHECK-LIST OF THE BIRDS OF MEXICO. PART II. Cooper Ornith. Soc., Pac. Coast Avifauna no. 33. 1-436 p., 7 col. pl. 1957. $6.00, paper; $7.00, cloth. Parts I & 2 bound together in cloth, $9.00. Order from T. R. Howell, Dept. Zool., U. Calif., Los Angeles 24, Calif.
This part covers families from trogons through sparrows and completes the work. All species and subspecies are listed. English and Spanish vernacular names are given for species. Spanish vernacular names are given for subspecies. Original descriptions are cited and taxonomic notes are provided where necessary. Ranges are described in fair detail, often with mention of habitat. Hypothetical list and index complete the volume. Part I, Pac. Coast Avifauna no. 29, 202 p., 1950, $4.00, paper, (see WR 62: 31) covers families through hummingbirds and is similarly organized. The work should prove extremely useful and authoritative.

BIRDS--MANUALS, FAUNAS, COMMUNITIES--Continued

Stewart, Robert E., and Chandler S. Robbins. (Patuxent Refuge, Laurel, Md.) BIRDS OF MARYLAND AND THE DISTRICT OF COLUMBIA. US F&WS, N. Am. Fauna no. 62. vi + 401 p., 69 figs., 1 pl. 1958. $1.75, paper, from Supt. Documents.

A different type of state bird book in which there is no mention of subspecies, habits, or recognition. Instead, the emphasis is on quantitative ecological data. The book is based on a great deal of field work all over the state, much study of the literature, banding records, and carefully screened records from many people. Species accounts are concise, jammed with information--intended for reference. A typical species account summarizes knowledge of seasonal relative abundance in regions of the state; gives data on nesting season; lists habitats used; mentions normal, peak, and extreme migration dates; reports a number of maximum 1-day counts; and presents a map showing where birds banded in Md. were recovered and where birds recovered in Md. were banded. In addition, for 103 species there are actual breeding population density figures for several locations and habitats. Maps scattered through the volume show the Md. ranges of birds of spotty distribution. Introductory sections discuss the history of field study of birds in Md. and D. C., the impact of land-use changes on birds, the natural regions of Md. and their characteristic birds, and explanation of methods and terms. Closing sections include a 12-p. bibliography, list of important new records, and index to species.

BIRDS--POPULATIONS & FLUCTUATIONS

Drinnan, R. E., and M. G. Ridpath. COUNTING FLOCKS OF ROOSTING BIRDS BY PHOTOGRAPHY. Bird Study 4(3): 149-159. 1957. [From abstract by O. L. Austin, Jr., Bird-Banding 29(1).]

"Describes two techniques of counting accurately large flocks of birds in motion, one by means of a consecutive series of still photographs, the other from a continuous motion picture record of the passing flock... The techniques are useful when it is impossible to photograph the entire flock at rest. Despite certain difficulties, which they discuss, the authors claim flocks can be counted this way with a maximum error of ± 5 percent."

Kolb, Haven, Jr., editor. WINTER BIRD-POPULATION STUDY. Aud. Field Notes 12 (3): 308-316. June 1958.

Reports of 23 studies of actual populations of birds of various habitats in winter. Areas studied extended from Me. to Calif. Most habitats were of forest types, but some were mixed farmland, field, marsh, park, and abandoned air field.

Udvardy, Miklos D. F. (U. of B. C., Vancouver.) AN EVALUATION OF QUANTITATIVE STUDIES IN BIRDS. In Cold Spring Harbor Symposia on Quant. Biol. 22: 301-310, 10 figs. 1958.

Summary: "While breeding bird censuses are rare in Europe and in other continents, a large amount of data has accumulated in North America during the last twenty years. Bird densities and species composition of certain North American major habitat types were computed and density trends are discussed with respect to basic synecological principles. Abundance per area unit and relative abundance of the species are discussed, examples are furnished from the census literature. Instead of individual dominance values, species-density classes are proposed which are absolute values and are thus comparable for different communities or species."

BIRDS--ECONOMICS, CONTROL, MORTALITY

Jorgensen, Richard N., Hayes T. Pfitzenmeyer, and Wm. C. Bramble. (Pa. State U., U. Park.) PREVENTION OF WOODPECKER DAMAGE TO WOODEN UTILITY POLES. Pa. State U., Prog. Rep. 173. 4 p., 6 figs. June 1957.

Digest: "Life history studies of the pileated woodpecker have shown that most severe damage to utility poles occurs in winter; no damage was recorded in June, July and August. Observation on woodpecker activities in the wild near utility lines, and on a captive bird, furnished basic information for research on damage prevention. The raising and maintenance of a captive pileated woodpecker, an unusual achievement having been done only once previously, provided a method of testing materials at low cost and under close observation that saved

much time in eliminating possible chemicals and protective devices. Several satisfactory mechanical means of repelling the birds were found but are not considered practical for use by the utility companies at this time. Several chemical repellents that can be combined with preservatives proved successful in the aviary and will be field tested as soon as possible in cooperation with utilities." These and other chemicals tested are listed. Painting sections of poles with various colors had no repellent value. In fact, colored areas were attacked more than others.

Kemper, Charles A. (119-1/2 Bridge St., Chippewa Falls, Wis.) DESTRUCTION AT THE TV TOWER. Passenger Pigeon 20(1): 3-9, 3 figs. Spring 1958.

The old 500-ft. TV tower at Eau Claire, Wis. apparently caused no loss of migrating birds. A new 1000-ft. tower near junction of Eau Claire and Chippewa rivers was erected in 1957. Several hundred small birds were killed there on Aug. 29 and Sept. 3, 1957. But the real disaster came on Sept. 20, when 20,000 (at a conservative guess) small birds were killed. A large sample was collected and is listed by species; it included a number of rarities. The author suspects that such huge kills on flight lanes may be of serious importance to the species. He theorizes that perhaps some birds with injured equilibriatory apparatus circle about chirping and thereby attract others that might have missed the tower. Would moderate illumination of the tower help? Certainly such avian mass mortality should be analyzed, perhaps by a central group that could assemble and evaluate data from many sources.

Kenyon, K. W., D. W. Rice, C. S. Robbins, and J. W. Aldrich. (US F&WS.) BIRDS AND AIRCRAFT ON MIDWAY ISLANDS / NOVEMBER 1956 - JUNE 1957 INVESTIGATIONS. US F&WS, Spec. Sci. Rep.--Wildl. no. 38: 1-51, 22 figs. + frontispiece. Jan. 1958.

Major paper on bird control at Midway airfield. About 16,000 black-footed and 236,000 Laysan albatrosses are present. These represent some 36% of species population of Laysan and about 14% of species population of black-footed albatross. Experiments proved that albatrosses homed well from distances of 1315-4120 mi. Strikes of albatrosses by aircraft occurred in 5% of landings or take-offs. Not all strikes damaged aircraft: in 6 months, only 7 planes were damaged in 1638 operations, an incidence of 0.4%. There are no records of crashes or loss of human life from bird strikes. Half of all birds soaring over runways were non-nesters, although these were only 1/6 of population. Two-thirds of soaring birds were from within 750 feet of the runways. Nest and egg destruction increased number of birds soaring over runways. Control by direct killing was judged unsatisfactory for several reasons, particularly ineffectiveness unless long continued. Topographic features that caused updrafts produced conditions favorable for soaring; birds gathered at such places. Probably the most promising method of reducing hazard from albatrosses is to flatten earth 750 feet on each side of runways. Blacktopping these areas would eliminate their use by birds. Black-footed albatrosses caused only 1% of strikes; they should be spared from reductional control. Sooty terns were struck frequently by aircraft but without damage to planes; they would peril jets. Harassment and other efforts to repel terns were unsuccessful.

Macklin, Paul R. (P. O. Box 281, Bryant, Ind.) SPITTLE INSECTS AS FOOD OF THE RED-WINGED BLACKBIRD. Auk 75(2): 225. Apr. 1958.

Red-wings fed consistently on spittle bugs of sweetclover for 5 weeks in summer of 1954 in Jay Co., Ind. Method of feeding is described.

Shaw, Elmer. (Rocky Mtn. For. & Range Exp. Sta., Ft. Collins, Colo.) THE BARK BUG'S ENEMY. Colo. Outdoors 7(4): 24-25, 2 figs. July-Aug. 1958.

Woodpeckers are the forester's ally in fighting the Engelmann spruce beetle. These birds do not injure healthy trees, but work on those already doomed by beetles. Researchers found that spruce beetles were about 99% of woodpeckers' food in winter and 65% in summer. Woodpeckers were working in one heavily infested area at the rate of 9 per acre. Forest Service men fastened screen over sections of infested trees to exclude woodpecker attack on beetles and thus determine effectiveness of woodpecker predation. Where woodpecker activity was heavy, the birds got 98% of the beetles. Where woodpecker activity was light, beetles were reduced by 50%. In places where woodpeckers were plentiful, the degree of feeding was roughly proportional to the number of beetles.

BIRDS--ECONOMICS, CONTROL, MORTALITY--Continued

Żajanc, Adolph. (US F&WS, Denver Federal Center, Colo.) PRELIMINARY REPORT ON THE USE OF THE EXPLODING SHOTGUN SHELL. 8 p., 4 figs., mimeo. Mar. 1958.

The shellcracker is used successfully to herd waterfowl--to frighten birds from an area of crop damage. It is a special 12-gauge shell that shoots a firecracker-like load that explodes in about 3 seconds at 100 to 150 yards from the gun. The report is very loud. Shellcrackers, developed by F&WS, are commercially available from sources named. Cost is high but is expected to drop for various reasons. Improvements in the cartridge are being made. This paper tells what the cartridge is like and summarizes the reports of many users on how it functions and what changes are desirable.

BIRDS--PARASITES AND DISEASES

Chute, H. L., and D. C. O'Meara. (U. of Me., Orono.) A BIBLIOGRAPHY OF AVIAN MYCOSIS (PARTIALLY ANNOTATED). Me. Agr. Exp. Sta. (Orono), Misc. Publ. 631. 81 p. Oct. 1957.

This bibliography lists more than 521 articles pertaining to fungus diseases of birds. Abstracts or annotations are provided for many of the entries, which adds greatly to value of the bibliography. Arrangement is by author, but a subject index is provided. The bibliography is based on the world's literature, but the authors do not claim that it is complete.

Piechocki, R. THE HEALING OF BROKEN BONES IN WILD BIRDS. Wiss. Z. Univ. Halle, Math.-Nat. 4(5): 1029-1056. 1955. [From German abstract by Müller-Using in Z. Jagdwissensch. 3(1).]

In German. Of 2236 birds examined, 33 were found to have broken bones which had healed. Wild birds have a better chance for survival than do untreated domesticated animals or man. Splinter fractures have highest mortality rate because of infection. Large birds have a better chance for survival than small birds because their lower metabolic rate permits them to endure longer hunger periods.--Vagn F. Flyger.

Reeves, W. C., G. A. Hutson, R. E. Bellamy, and R. P. Scrivani. (U. Calif., Berkeley.) CHRONIC LATENT INFECTIONS OF BIRDS WITH WESTERN EQUINE ENCEPHALOMYELITIS. Proc. Soc. Exp. Biol. & Med. 97(4): 733-736. Apr. 1958.

Summary: "Western equine encephalomyelitis virus was isolated from tissues of 8 of 284 birds at intervals of 1 to 10 months after experimental infection. Isolations were from Brewer's blackbird, cowbird, tricolored blackbird, house finch and English sparrow. Positive tissues were blood, spleen, liver, lung, brain and gall bladder. The potential importance of birds as long-term reservoirs of virus and sources of vector infection should be determined."

Stamm, Donald D. (US Pub. Health Serv., Montgomery, Ala.) STUDIES ON THE ECOLOGY OF EQUINE ENCEPHALOMYELITIS. Am. J. Pub. Health 48(3): 328-335. Mar. 1958.

Includes much information on role of wild birds of various localities in epidemiology of w. and e. equine encephalomyelitis. See also the next paper in same journal: Current Views on the North American Arthropod-borne Virus Problem, by M. Schaeffer, R. E. Kissling, and R. W. Chamberlain, p. 336-343.

QUAIL

Bartholomew, George A., and Wm. R. Dawson. (U. Calif., Los Angeles.) BODY TEMPERATURES IN CALIFORNIA AND GAMBEL'S QUAIL. Auk 75(2): 150-156, 4 graphs. Apr. 1958.

Summary: "A conspicuous diurnal cycle of body temperature that is correlated with level of activity exists in both juvenile and adult Gambel's and California Quail at moderate ambient temperatures. Body temperatures vary between 40° and 41.5°C. (104° and 106.7°F.) during moderate activity and are about 1.5°C. (2.7°F.) lower during the night. Long-term exposure of Gambel's Quail to 39°C. (102.2°F.) diminished the amplitude of the diurnal cycle but did not abolish it. Short-term exposure to ambient temperatures increased to more than 40°C. (104°F.) resulted in elevated body temperatures in individuals of both species. Panting

occurred only after body temperature exceeded 43.5°C. (110.3°F.). These quail resemble birds of other groups in their storage of heat at high ambient temperatures. Their demonstrated tolerance of body temperatures as much as 4°C. (7.2°F.) in excess of normal levels appears to be of primary importance in their survival in hot environments."

Kozicky, Edward L. (Olin Mathieson Chem. Corp., E. Alton, Ill.) EXPERIMENTAL FLIGHTING OF BOBWHITE QUAIL AT NILO FARMS. Game Bird Breeders, Pheasant Fanciers, and Aviculturists' Gazette 7(3): 11-13, 54, 1 photo. Mar. 1958.

Pen-reared bobwhites have not been the easiest birds to handle on shooting preserves. Less than 25% are often recovered. New procedures give recovery of about 75%. Recommendations: 1. Use only mature, healthy, full-plumaged birds from a stock of good fliers. 2. Skip the flight-pen training. This does little if any good, but causes losses and injuries. 3. Catch birds from holding pens and allow each group of 5-7 to rest 3-4 hours in a cardboard chick carton. 4. Carry to field in carton. 5. Transfer group to poultry-mesh basket 18 in. long, 12 in. wide, and 3.5 in. high. Mouth of basket is easily covered by hand. 6. Place basket in food patch about 15 min. before shoot and leave at once. Birds tend to remain in or return to food patch, and usually flush well as a covey.

Loveless, Charles M. THE MOBILITY AND COMPOSITION OF BOBWHITE QUAIL POPULATIONS IN SOUTH FLORIDA / WITH NOTES ON THE POST-NUPTIAL AND POST-JUVENAL MOLTS. Fla. Game & Fresh Water Fish Comm., Tech. Bul. no. 4. 64 p., 12 figs. 1958.

Based on M.S. thesis study made on Charlotte Co. Wildlife Area near Ft. Myers in 1954, a good year for quail. Quail were trapped and marked. Four color phases were described. Of 138 quail that completed post-juvenile molt of primaries, 33.4% molted beyond the 8th juvenile primary. Nineth and 10th juvenile primaries were molted even among birds hatching as late as 1st week in Aug. Premature molt of upper primary coverts occurred in a larger percentage of Fla. quail than in other quail. The abnormal covert molt took place in orderly sequence, beginning with distal feather. An error of 2-3 in juvenile:adult ratios would result if buffy-tipped wing coverts were used as age criteria in Fla. A definite annual cycle of age and sex ratios was noted. Av. brood size was 9 at age of 6-8 weeks. There were 5 young per hen at end of Aug. Working from band and recovery data, quail population of area was estimated at 5.97 to 6.32 acres per bird in spring and 1.79 to 2.17 acres per bird in late summer. These figures suggest correction factor of 13-18% for spring bird-dog census and 40% correction for fall census. Av. cruising radius was about 0.25 mile in spring, 0.5 mile in summer, and 0.44 mile in fall. Ten birds moved an av. of 6 miles in fall shuffle; 2 of them moved 9.5 miles. Extreme movements were associated with movements of coveys. Automatic quail feeders were spaced about 1/4 mile apart. Many quail (33%) used only 1 feeder, 50% used 2 feeders, 15% used 3 feeders, and 2% used 4 feeders; 1 bird used 5 feeders. The garbage can type of feeder was used a great deal more than Scruggs feeders or shelter-type feeders.

Robinson, T. S. NUMBER OF BOBWHITES IN KANSAS. Kansas Sportsman 4: 13. 1957. [From abstract by E. E. in Auk 75(2).]

"Based on wings of birds shot by sportsmen, the total population is estimated at over six million, of which about 89% die each year, as a result of disease, old age, predation, and hunting."

Shoemaker, Hurst H. (Vivarium Bldg., Wright & Healey Sts., Champaign, Ill.) WILL THE COTURNIX REPLACE THE BOBWHITE QUAIL? Ill. Wildl. 13(3): 11, 1 fig. June 1958.

Comparison of field-trial value of these birds. Sixteen coturnix and 19 bobwhites, all pen reared, were dizzied and released before dogs, hunters, and judges. Six coturnix and 7 bobwhites flushed properly. Five coturnix but no bobwhites were picked up by dog or handler. Five coturnix and 12 bobwhites flushed during point before handler got to them or as dog ran over or near them. Author concludes that for field trials the bobwhite is equal to coturnix and in some ways better. Furthermore, the coturnix is only half as big and appears hopelessly small in the frying pan. Coturnix lays more eggs, it is true, but bobwhites lay more than enough for breeders to take care of. Coturnix may compete with bobwhites. Coturnix is migratory and seldom has bred where released. Probably our money and efforts can be spent best in improving conditions for native game birds.

PHEASANTS

Asmundson, V. S., and F. W. Lorenz. (U. Calif., Davis.) HYBRIDS OF RING-NECKED PHEASANTS, TURKEYS, AND DOMESTIC FOWL. Poultry Sci. 36(6): 1323-1334. 1957. [From Biol. Abs. 32(6).]

Reciprocal crosses were made between birds of three genera. The fertility was higher for the turkey-pheasant and chicken-pheasant crosses than for the chicken-turkey cross: none of the latter hatched, compared to about 5% of all eggs set of the former. There were more male than female hybrids from the pheasant-turkey cross while the sex-ratio of the chicken-pheasant hybrids approached equality. In weight the hybrids obtained were intermediate between the parent species from 4 weeks to maturity. Of over 30 birds raised from each of the turkey-pheasant and the chicken-pheasant crosses all were sterile. The feathering of the hybrids on the head and neck was typical of the pheasant. Plumage color genes dominant to wild type plumage within the species were fully expressed in the hybrid.--V. S. Asmundson.

Curtin, Leo V. (McMillen Feed Mills, Decatur, Ind.) NUTRITIONAL REQUIREMENTS OF PHEASANTS. Modern Game Breeding 28(5): 8-9, 1 photo. May 1958.

Kirkpatrick, Charles M. (Purdue U., Lafayette, Ind.) RECENT EXPERIMENTS WITH DISEASE AND REPRODUCTION IN BOBWHITE QUAIL. Modern Game Breeding 28(3): 18-20, 2 figs. Mar. 1958.

How to treat and prevent ulcerative enteritis of captive quail with streptomycin, and how to increase reproduction by manipulation of lighting. Material presented here is chiefly from 9 papers published by author and others, 1950-1954, and cited here.

Kissling, R. E. (US Pub. Health Serv., Montgomery, Ala.) EASTERN EQUINE ENCEPHALOMYELITIS IN PHEASANTS. J. Am. Vet. Med. Assn. 132(11): 466-468. June 1, 1958.

Experimental study of possibility of immunizing captive pheasants against this disease. Partial success was attained.

[Knoder, C. Eugene.] REEVES HUNTING? Ohio Cons. Bul. 22(6): 29. June 1958.

2,000 Reeves pheasants have been reared at state game farms and released in hilly, wooded country of Ohio. Plans call for release of 15,000 by 1960. "Knoder said he believes that in the next two years the Reeves either will have established itself in Ohio or hunters might as well be allowed to harvest the stocked birds... Game technicians are pinning their hopes on the Reeves to survive in southern Ohio because the bird inhabits hilly and wooded country in China similar in habitat to the unglaciated region of Ohio."

Ridley, Bromfield Lewis. NESTING BEHAVIOR OF THE RING-NECKED PHEASANT. Ph.D. thesis, Iowa State Coll. 98 p. 1957. [From abstract in Dissertation Abstracts 18(3).]

Seventy-nine nests were studied with automatic recorders in 2 years. No correlation was found between mean height of nesting cover and nesting success. Hens came to 18 nests 82 times to lay 65 eggs in 62 days. Nest attentiveness during laying occurred any time between 0500 and 1900 hours; peak was around noon. It may prove possible to predict which hens will incubate by observing length of attentive periods during laying. During incubation, most inattentive time was in afternoon, with peak between 1600 and 1700 hours. Incubating hens sometimes left nests at night. Little if any relationship was found between stage of incubation and length of inattentive periods. Maximum and minimum daily air temperatures had no effect on amount of time away from nests. Hens av. about 28 bodily movements per day on nests. These motions could not be correlated with stage of incubation or number of eggs. Peak of these motions came between hours 1100 and 1200. Av. hatching interval covered about 23 hours, usually from one morning to next. Most desertion by incubating hens seemed to result from flushing by people, which caused desertion of about half of nests so disturbed. Desertion decreased as incubation progressed. Predation was not excessive on nests that had not been deserted. In general, behavior of nesting hen pheasants in wild was characterized by much variation.

Robeson, Stacy B., and Dirck Benson. (N. Y. Cons. Dept.) PHEASANT USE OF FIELD BORDERS IN WESTERN NEW YORK. N. Y. Fish & Game J 5(1): 94-99. Jan. 1958.

Abstract: "Observations made on 70 miles of field borders on a 3,500-acre area in Monroe County were analyzed to determine the degree to which type, width, density, and species composition affected their degree of use by pheasants. Records of pheasant use totaled 211 during the summer and 1,501 during the winter. Density of cover seemed to be the most important factor influencing pheasant usage. Of the various species providing dense cover, grape was outstanding and seemed to merit consideration for encouragement."

GROUSE, PARTRIDGE, ETC.

Anon. CALIFORNIA INTRODUCES THE BARBARY PARTRIDGE. Modern Game Breeding 28 (5): 9-10. May 1958.

152 individuals of Alectoris barbara barbara have been released in foothills of San Joaquin Valley near Lindsay, Tulare Co., an area nearly devoid of resident game birds. The stock came from Morocco.

Blackford, John L. (Libby, Mont.) TERRITORIALITY AND BREEDING BEHAVIOR OF A POPULATION OF BLUE GROUSE IN MONTANA. Condor 60(3): 145-158, 2 figs. May-June 1958.

Summary: "Three displaying Blue Grouse males were identified on individual territories. None was noted elsewhere between April 16 and June 3, 1957, in 21 hours of close-range observation, except during one evening of group display. Movements and daily routine of breeding males on their home grounds were recorded. Wing notes, hooting, hooting stations, drumming, and courtship are described in relation to territorial occupancy. The behavioral characteristics of this population reinforce known affinities, and establish new relationships, between the racial groups of Dendragapus obscurus."

Bump, Gardiner. (US F&WS.) RED-LEGGED PARTRIDGES OF SPAIN. US F&WS, Spec. Sci. Rep.--Wildl. no. 39. vi + 38 p., 20 figs. May 1958.

A compilation of available information, new and old, on a bird that is being introduced into the U. S. Among subjects considered are: classification, history of introductions, abundance, description, weights, habitats, water relationships, foods, feeding habits, local movements, roosting, nesting, eggs, behavior, calls, relationship of precipitation and temperature to distribution and abundance, predation, reproductive capacity, diseases, relation to agriculture, utilization, methods of hunting, methods of trapping, and artificial propagation. In general, the red-leg seems to be a harmless, desirable, prolific bird that might do well in our southern plains and prairie regions and in parts of our Southwest. The red-leg is a strong flyer, weighs about a pound, and should be an attractive game species for Am. hunters.

Chambers, Robert E., and P. F. English. (W. Va. Cons. Comm., Elkins.) MODIFICATIONS OF RUFFED GROUSE TRAPS. J. Wildl. Mgt. 22(2): 200-202, 4 figs. Apr. 1958.

How to make collapsible mirror traps that are covered with net rather than wire mesh; and how to increase effectiveness of cloverleaf trap by placing traps at both ends of the lead fence as well as in the middle.

Jenkins, David. (Marischal Coll., Aberdeen, Scot.) CHICK SURVIVAL IN A PARTRIDGE POPULATION. Animal Health (journal of Animal Health Trust, 14 Ashley Place, Westminster, London S.W.1, Eng.) 7: 6-10. 1957.

The main thesis of this compact paper is "that juvenile survival rates vary according to the amount of mutual disturbance among the adults before the breeding season, suggesting an adverse effect on their reproductive powers which is passed on to the young and favours their early death." Perdix perdix were studied in relatively open British farmland for several years. In fall and early winter, losses were small and mainly from shooting. In late winter, however, losses were high, 30-54%. These losses were in proportion to size of population, and they brought the population down to about 100 pairs each spring. The losses occurred suddenly, within 2 weeks in late Jan. and early Feb., and were not related to weather. They were associated with change in behavior at

pairing time, when aggression was maximal. They represented mortality and also emigration, especially by young ♂♂. Author calculated that of 100 partridges alive at age of 6 months, 38 would be alive at 18 months, 11 at 3 years, and 6 at 4 years. In late winter, the birds occupied undefended home ranges. These ranges varied widely in size; they were smallest where population was high or cover was dense. Partridges living at high density in poor cover spent much time in combative, watchful, or displacement activities. Reproduction was high and hatching success was 84% or more. Chick mortality was high, especially in cold, wet weather, and at best about half the chicks lived through the summer. Most deaths occurred in first day or 2, and with no evident disease or predation. Where cover was good in March, chick survival was high. Where cover was poor in March, chick survival was low. Poor cover in March caused much social strife, which apparently decreased the ability of adults to produce viable young. Improvement of winter cover should increase both number of breeding pairs and chick survival.

Johnson, Morris D. (N. Dak. Game Dept.) HUN WINGS TELL A STORY. N. Dak. Outdoors 20(9): 9-12, 17, 8 photos. Mar. 1958.

Provides Hungarian partridge data on: age ratios in N. Dak., 1950-57; sex ratios, 1955-57; hatching dates; and age composition of coveys. Limited data suggest that about 1/3 of coveys consists of birds from different broods.

Pollack, Bill. (Mass. Div. Game.) YOU SHOULD HARVEST MORE GROUSE! Mass. Wildl. 9(3): 6-7, 12-13, 4 figs. May-June 1958.

Data from Mass., Mich., N. Y. and other states are reviewed to show that ruffed grouse population densities are not increased by closed seasons or light hunting. The present 27-day season in Mass. is not liberal enough: probably no more than 15% of the annual production is being bagged. Neighboring states are doing well with far more liberal seasons. Liberalization will be sought in Mass.

WESTERN STATES EXOTIC GAME BIRD COMMITTEE. ANNUAL REPORT, MAY 1, 1957--APRIL 30, 1958. About 70 p. June 1958. [Not for publication. Prepared in small quantities for cooperators. Wayne W. Sandfort, Colo. Game & Fish Comm., is current chairman of the Committee.]

Progress reports from various western states, provinces, and Hawaii. Reports pertain to such matters as status in wild, reproduction, bags, sex ratios, field conditions, new introductions, etc. A few findings may be mentioned. Ariz. noted some reproduction in wild by chukar and black francolin. Calif. released Barbary partridges (Alectoris b. barbara) in Tulare Co. Colo. and other states in its region had high precipitation; this is thought to have favored chukars and to have caused wide dispersal of them. Colo. was propagating fertile hybrids of chukar and red-legged partridges. Hawaii had a bag of 1241 chukars with hunter success of 1.77 per day. Hawaii released chukars, Reeves' pheasants, and Erckel's francolins. Idaho permitted chukar hunting in 20 counties; experienced hunters found lots of birds. Nevada bagged 55,500 chukars, an all-time record, and expected even better bag in 1958. N. M. released more Turkish chukars and was propagating white-winged pheasants (P. colchicus bianchii) from Afghanistan and crosses with these and ringnecks. Ore. had high production in wild of all species of upland game birds. It released pheasants, chukars, Eur. gray partridges, bobwhites, and valley quail. Utah hunted chukars in 25 counties and av. hunter bagged 0.92 chukars per season. Seven of the chukars shot were 3.5 years old. Black and red-legged partridges released previously were not seen or reported. Wash. had a rapidly increasing chukar population thanks to 2 consecutive favorable winters. The state was rearing bamboo partridges (from Japan), bobwhites, valley quail, mountain quail, coturnix, and Hungarian partridges. Wyo. reported on age ratios, brood sizes, and food habits of chukars. Urgent needs in chukar work were: 1) adequate census method, 2) way of telling young from adults during fall hunting season.

Aldrich, John W., and Allen J. Duvall. (US F&WS.) DISTRIBUTION AND MIGRATION OF RACES OF THE MOURNING DOVE. Condor 60(2): 108-128, 3 figs. Mar.-Apr. 1958.

Variation and taxonomy are analyzed to provide a tool for management research. Data on ecological distribution and migration of the races are summarized. Races recognized are: "1. The long winged, dark population of eastern United States and southern Ontario--Z. m. carolinensis. 2. The long winged, pale population of western United States, southwestern Canada, and temperate Mexico--Z. m. marginella. 3. The short winged, short legged, long billed, pale population of Panama and possibly other parts of Central America--Z. m. turturilla. 4. The short winged, dark to medium toned, deep buff-bellied population in the West Indies and Florida Keys--Z. m. macroura. 5. The relatively large footed, large billed, very dark brownish populations on Clarion Island of the Revilla Gigedo group, off the Pacific coast of Mexico--Z. m. clarionensis." Races of e. and w. U. S. can be distinguished by wing color alone, which facilitates determination of races in samples of birds shot by hunters. "There is an extensive postbreeding wandering of birds in all directions, particularly northward, and there is an extensive mingling of racial types during migration. Concentrations of fall migrants occur in certain areas in the southwestern states and both east and west of the Gulf of Mexico."

Castoro, Paul L., and A. M. Guhl. (Kans. State Coll., Manhattan.) PAIRING BEHAVIOR OF PIGEONS RELATED TO AGGRESSIVENESS AND TERRITORY. Wilson Bul. 70(1): 57-69. Mar. 1958.

Summary: "1. The relative aggressiveness of Common Pigeons was measured by means of paired encounters in a combat cage or neutral area. 2. Pairing behavior was facilitated through submissive behavior by the female. 3. The most aggressive males had precedence in pairing if under extreme competition with other males and when confined in flight cage. 4. Territorialism made it possible for all the males, irrespective of levels of aggressiveness or dominance, to establish pair-bonds, when the number of individuals of each sex was nearly equal."

Hanson, H. C., N. D. Levine, C. W. Kossack, Sidney Kantor, and L. J. Stannard. (Ill. Nat. Hist. Surv., Urbana.) PARASITES OF THE MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS) IN ILLINOIS. J. Parasit. 43(2): 186-193. Apr. 1957.

In a 7-year survey, "Haemoproteus sacharovi was found in 58% of 392 immature birds and in 43% of 72 adults; H. maccallumi in 30% of the immatures and in 43% of the adults; Leucocytozoon marchouxi in 1.2% of the immatures and in 6.5% of the adults; and unsheathed microfilariae 46 to 62 microns long in 2 birds. No helminths were found in the intestines of more than 50 doves. The Mallophaga, Columbicola macrourae, Physconelloides zenaidurae, and Colpocephalum sp. and the mites Falculifer sp. and Megninia sp. were found commonly on the doves' feathers, and the mite Bdellonyssus sylviarum was found on the feathers of 2 birds. No hippoboscid flies were found despite a special search for them. Bdellonyssus sylviarum was the only ectoparasite found in 42 nests; it was present in more than half of the nests containing young doves. The incidence of Haemoproteus sacharovi was 31% in very young doves; in older birds it did not vary markedly, fluctuating between 52% and 69%. The incidence of H. maccallumi increased steadily in growing birds from 7-8% to 70%. The incidence of both Haemoproteus species varied markedly in different parts of the state and in different years. In view of the high incidence of Haemoproteus and the absence of hippoboscid flies, it is concluded that the natural vector of the blood protozoon must be some other ectoparasite."

Hofstetter, Fritz-Bernhard. AN INVESTIGATION OF A POPULATION OF THE COLLARED TURTLE DOVE. J. Ornith. 95(3/4): 348-410. 1954. [From abstract by D. S. Farner, Bird-Banding 29(1).]

In German. Very extensive study of local population of Streptopelia decaocto, a bird similar to the ringed turtle dove that is established around Los Angeles and Miami. The paper discusses expansion of population, food, travels to feeding grounds, roosting places, territories, nesting and reproduction, productivity, and turn-over. Farner's abstract gives some of the findings.

Anon. WATERFOWL 'CAFETERIAS' PROTECT CROPS, PROVIDE GOOD HUNTING. Outdoor Calif. 19(2): 4-5, 3 photos. Feb. 1958.

Calif. waterfowl management areas are proving satisfactory in reducing crop depredations. They also provide hunting for waterfowl and upland game as well as fishing. Local landowners help decide when hunting should be opened on a given area. Eight of the areas are operated by the state, 4 by federal government. "The program is far from perfect even yet...and probably it never will be able to satisfy all the needs of the various interests involved, but most ranchers, sportsmen and...agency personnel are convinced that waterfowl management areas are worth every penny they cost. Their role as California becomes ever more crowded is likely to be even more vital."

Anon. NATURALIZED CITIZENS. Narragansett Naturalist (Aud. Soc. R. I., 40 Bowen St., Providence 3, R. I.) 1(2): 36-37, 2 figs. Apr.-June 1958.

Introduced mute swans were scarce in the wild before the 1940's but now they can be seen in almost any coastal pond of R. I. The R. I. population may have originated from an overflowing Long Island population. First known nesting in R. I. was in 1948, but now the swans are nesting all along the R. I. coast (map). Game biologists are worrying about what flocks of 100 or more mute swans will do to waterfowl food-plant resources. The swans are permanent residents, but move back and forth along the coast. They lay clutches of about 3 eggs in mid-April. They are strongly territorial and sometimes fight to the death.

Bellrose, Frank C. (Ill. Nat. Hist. Surv., Urbana.) ORIENTATION OF DISPLACED WATERFOWL IN MIGRATION. Wilson Bul. 70(1): 20-40, 8 figs. Mar. 1958.

Experiments were made with blue-winged teal, mallards, and wood ducks. Young blue-wings were held in Ill. until adults had left. The young migrated south without guidance from adults or from air movements. Data from Delta, Manitoba, suggest that many flocks of blue-wings normally migrate without adults. Young and adult drake mallards were trapped in Ill. and released in Utah in Nov. Practically all direct recoveries were in the Great Salt Lake Basin. Indirect recoveries after breeding season revealed that about 2/3 of adults returned to Miss. Flyway, but 2/3 of young remained in Pacific Flyway. Wood ducks hand-reared in Ill were released in Ill., Ind., and Wis. All remained at release sites into early autumn; some were late in migrating, a few remained over winter. Young hen wood ducks strongly tended to home to area inhabited prior to fall migration. No transplanted wood ducks were known to return to their natal home. Conclusions: The longer a duck remains in an area, the greater its homing attachment to the area. This suggests that increased propensity to home with increasing age is related to memory of topographic features. But not all waterfowl migrate by memory of topographic features. Blue-winged teal have an innate means of determining direction as shown by southward migration of young over unfamiliar territory. The experiments gave no evidence of ducks being able to choose the direction of home when transplanted to unfamiliar territory.

Clark, Gordon M., David O'Meara, and James W. Van Weelden. (Patuxent Refuge, Laurel, Md.) AN EPIZOOTIC AMONG EIDER DUCKS INVOLVING AN ACANTHOCEPHALID WORM. J. Wildl. Mgt. 22(2): 204-205, 2 photos. Apr. 1958.

Numbers of dead and dying eider ducks were reported on the coasts of Me. and Mass. from Sept. to March, 1956-57. Samples of these ducks were found to be heavily infected by Polymorphus botulus, an acanthocephalid of moderate size and bright orange color. The large numbers of worms present (49-610), together with indications of considerable tissue injury, suggest that P. botulus may be an important contributing factor to epizootics among eider ducks.--Authors.

Craighead, John J., and Dwight S. Stockstad. (Mont. State U., Missoula.) GOSLINGS DESCEND FROM AERIAL NEST. J. Wildl. Mgt. 22(2): 206-207. Apr. 1958.

A newly hatched brood of Canada geese jumped from an artificial aerial nest site to the water, a vertical distance of 15 feet, without apparent injury. Detailed observations on 77 aerial nests have revealed only 1 gosling fatality attributable to descent from elevated nests. Elevated artificial nesting platforms are not believed to be a hazard to newly hatched goslings.--Authors.

Dalrymple, Harold. (Ohio Div. Wildl.) WOODIES APLENTY. Ohio Cons. Bul. 22 (4): 3, 29, 3 photos. Apr. 1958.

18 wood-duck boxes were placed around an artificial 3-acre pond in Ohio in 1954-55. Apparently wood ducks used all of the boxes in 1956, except 1 box removed for repair. Results are tabulated for each box. A total of 250 eggs was laid. Only 85, or 34%, hatched. This av. about 28.3 wood ducks hatched per acre of pond.

Dillon, S. Tenison. (U. Wis., Madison.) A NINE-YEAR STUDY OF FALL WATERFOWL MIGRATION ON UNIVERSITY BAY, MADISON, WISCONSIN. I. Trans. Wis. Acad. Sci., Arts & Lett. 45: 31-57, illus. 1957. [From Biol. Abs. 32(3).]

University Bay on Lake Mendota, covering an area of 180 acres, lies within a game refuge where hunting has been prohibited since 1942. Plant food for waterfowl is abundant. Counts were made during the fall migration from 1946 to 1954 at an average rate of 1/2.6 days for an 80 day period each year. 23 spp. were seen, of which 11 were considered common. 258,506 waterfowl were recorded during the 9 year period, or 360/day. 56% of these were coots, 15% mallards and 12% black ducks. There has been an average annual increase of 29% in the number of waterfowl counted; diving ducks and coots are largely responsible. Changes in the duck population on University Bay are similar to those reported for the flyway as a whole, but the coot population increased on the bay while decreasing on the flyway.--W. Churchill.

Eggert, Paul. FULL-WINGED BUT FLIGHTLESS. Mag. of Ducks & Geese 9(11): 28-29, 1 fig. Spring 1958.

How to pinion wild geese by removing a short section of tendon.

Elder, Wm. H. (U. Mo., Columbia.) PRELIMINARY REPORT ON THE NE-NE IN HAWAII. Ninth Ann. Rep. Wildfowl Trust, p. 112-117, illus. 1958.

Dr. Elder has made a year's study of the rare Hawaiian goose. He found that there were at least 35 living in the wild and about 94 in aviaries of the world. He found 6 wild pairs breeding in 1957 and knew of 10 young reared. The birds live in excessively rough country at high elevations. They nest in Nov.-Jan.--and once were hunted at that time like other waterfowl. Young grow only half as fast as Canada geese, perhaps because the days are short. Greens make up most of the food and there is no indication of food shortage at any season. Rain and fog-drip supply plenty of drinking water, and the birds will mate on land although they seek standing water at onset of breeding season. The geese are tame and curious, not a sporting species. Mongooses and dogs may be serious predators. Summering grounds have been closed to all hunters for 6 months of the year. The known nesting area is to be posted, patrolled, and its predators poisoned.

Eygenraam, J. A. THE SEX-RATIO AND THE PRODUCTION OF THE MALLARD, ANAS PLATYRHYNCHOS L. Instituut voor Toegepast Biologisch Onderzoek in de Natuur (Kemperbergerweg 11, Arnhem, Netherlands), Mededeling no. 34. 117-143 p., 15 figs. 1957. Reprinted from Ardea 45(3/4), Dec. 1957.

In English. Based on extensive studies in Netherlands. Sex ratios cannot be determined accurately before Nov. owing to secretiveness of hens during breeding and molting. Sex ratio in Nov. is 114 drakes per 100 hens. Presumably drakes would be even more predominate before Nov., for from July to Nov. hunting affects drakes more than hens. Relative number of drakes drops a little more during winter, so just before breeding season the ratio is about 106:100. Thus the sex ratio varies through the year between 106:100 and something more than 114:100. Males are more numerous than ♀♀ not only among adults but also in most samples of juveniles: in 5-year Aug.-Sept. total, sex ratio for adults is 134:100, and for juveniles is 113:100. Production was estimated from size and age of 3717 broods in combination with sex ratio and percentage of unproductive hens. Peak of hatch is in first part of May. Av. number of ducklings reared by a successful ♀ is 6. The percentage of hens unsuccessful in rearing young probably varies but was about 24 in 2 years. Allowing for these hens, av. production per hen is 5. Since the Netherlands has about 145,000 hen mallards, annual production is around 725,000. The years in which the study was made "were by no means favourable" for production, judging from av. decoy catches in Sept.

Hanson, Harold C., and Campbell Currie. (Ill. Nat. Hist. Surv., Urbana.) THE KILL OF WILD GEESE BY THE NATIVES OF THE HUDSON-JAMES BAY REGION. Arctic 10(4): 211-229, 5 figs. 1957 (1958).

All available data on local kills of geese, band returns, size of human populations, and size of different goose populations are used to estimate significance of kills by natives on flyway populations. Blue and snow geese are the most important to natives. Kills are well under 5% of the numbers wintering in La. and Texas and hence cannot be an important population factor. Canada geese of the Miss. Flyway have increased owing to better management in U. S. Take of Canadas by natives was never a major factor and is now even less important. The take of Richardson's goose by natives appears to be small. "The present investigation has indicated that the kills of geese made by the native hunters in the Hudson-James Bay region are within safe limits of what the nesting populations of that area can withstand."

Hawkins, Arthur S., committee chairman. A GUIDE TO MISSISSIPPI FLYWAY WATERFOWL MANAGEMENT. PART I. PROBLEMS, PRINCIPLES, AND POLICIES. Miss. Flyway Council. 110 unnumbered p. + cover sheets; illus. with sketches. 1958. [Publ. by Wis. Cons. Dept. in small numbers for official use; not generally available. For availability of digest, see end of abstract.]

Important document prepared by many people and adopted as official guide by state and federal agencies. In a vigorous, forward-looking manner, Part I sets forth the problems and needs of waterfowl management in the flyway and states the policy taken on each point. Part II will consider specific projects and programs. It will be developed part by part over a long period, not as a formal publication. Part I covers many subjects: values, land-use relationships, public relations, importance of research, population management for different groups of waterfowl, regulations, enforcement, mortality, the place of artificial propagation, habitat management in different regions of the continent, acquisition or other control of habitat, and the role of specific organizations in the program. The Guide represents a great deal of constructive thinking and it provides a large amount of background information and perspective. The Guide is intended for everyone interested in waterfowl and waterfowl hunting, but it will be most directly valuable to individuals and organizations responsible for planning and executing programs. It is issued in loose-leaf form so that changes and additions can be made easily. For the same reason, pages are not numbered but bear code designations; sections are thus readily found by use of the table of contents. Introductory sections, on blue paper, give a review of the Guide in a popular, inspirational style. These introductory and review sections are also issued on orange paper as a separate pamphlet of 16 p.; this is available for 10¢ from Wis. Cons. Comm., Madison.

Humphrey, Philip S. (Peabody Mus., Yale U., New Haven, Conn.) CLASSIFICATION AND SYSTEMATIC POSITION OF THE EIDERS. Condor 60(2): 129-135, 1 fig. Mar.-Apr. 1958.

Summary: "The tracheal structure, plumage patterns, food habits, and diving habits of the genera in the Tribe Mergini (Delacour and Mayr, 1945) are compared. It is concluded that the eider genus Lampronetta should be placed in the genus Somateria, but that Polysticta should be maintained as a separate genus. It is further concluded that the eiders have their closest relationships with the Anatini, and that they should be placed in a separate Tribe Somateriini, next to the Anatini, as proposed by Delacour (1956)."

Hyde, Robert K. FLORIDA WATERFOWL BAND RECOVERIES 1920-1957. Fla. Game & Freshwater Fish Comm., Fed. Aid Proj. W-19-R. 57 p., 35 maps. 1958.

Text of this booklet takes up waterfowl by species and tells where birds banded or colored in Fla. were recovered, and where birds recovered in Fla. were banded. It also mentions a few interesting records and tells how long the av. bird of a given species lived between banding and recovery. The 35 maps show points of banding and recovery for waterfowl banded or recovered in Fla. "The purpose of this report is to acquaint the sportsmen of Florida with the banding program and to summarize these band recoveries concerning Florida so that they might be readily available to anyone analyzing such data. No analyses of any kind are included herein."

Kuznetsova, O. N. LEECHES - PARASITES OF SWIMMING BIRDS. Ptitsevodstvo 1955(11): 32-34. 1955. [From Biol. Abs. 32(6), from Referat. Zhur., Biol., 1956, no. 77802.]

In Russian. The morphology and biology of the leeches Protoclepsis tesselata and P. maculosa, parasitic in the upper respiratory passages, esophagus, or conjunctiva of the eyes in ducks, geese, swans, and other swimming birds. Methods for the treatment of protoclepsiasis are given.

Lind, Hans. A STUDY OF THE MOVEMENTS OF THE SHIELD-DUCK, TADORNA TADORNA. Dansk Ornith. For. Tidsskr. 51(3): 85-114, illus. 1957. [From abstract in Biol. Abs. 32(3).]

In Danish with English summary. Long-term data are discussed in relation to migration, molt migration, flock composition, breeding biology, and population increase at Tipperne sanctuary in Denmark.

Marquardt, Richard E. A STUDY OF WATERFOWL PRODUCTIVITY ON AN UNMANAGED SEDGE-MEADOW MARSH IN MAINE. M. S. thesis, U. Maine. iv + 192 p., 16 figs. Nov. 1955. [Copy in US Dept. Int. Library.]

Good study that gives much information on black and ring-neck ducks. These birds were studied for 2 years in Goose River marshes. Author discusses timing of arrival in spring, sex ratios, courtship behavior, territorialism, nest sites, nesting, incubation, hatching, brood biology, travels of young, predation, productivity, and management. The area had 1 breeding pair of ducks per 13 acres. Production of flying young av. 5.94 per pair for ring-neck, 5.76 for black, and 4.67 for wood duck. Total productivity was 1 young per 2 acres of marsh and water. Territorialism was evident in black duck, not in ring-neck. Visual range appeared to be important in determining boundaries of black duck territories. Probably numbers of breeding blacks could be increased by more interspersion. Experiments should be conducted in making openings in dense brush and in dynamiting potholes and channels. Fluctuations of water level tended to limit productivity. Slight modification of present water-control structures and proper manipulation of them would remedy this. Human disturbance was not a great factor, but disturbance of broods could be minimized by eliminating boating on area from May 1 to July 31.

Marshall, David B. (US F&WS, Burns, Ore.) WATERFOWL IN THE PACIFIC FLYWAY OF NORTH AMERICA. Ninth Ann. Rep. Wildfowl Trust, p. 128-137, illus. 1958.

A general article written to explain Am. conditions and systems to people in other lands. It tells what percentage of representation different species of waterfowl have in the flyway, discusses the movements and numbers of Ross's goose in the U. S., shows how aerial surveys and banding are used to obtain data for regulation of hunting, demonstrates the vital importance of refuges in providing places for millions of birds and in reducing crop damage, and mentions some lines of research that are followed. It is revealing even to Americans to know that 5 or 6 million waterfowl, half or more of the flyway population, may be on Tule Lake and Lower Klamath refuges in Oct., and that 7,000 acres of grain are left unharvested for the birds on these refuges.

Matthews, G. V. T. (Wildfowl Trust, Slimbridge, Gloucestershire, Eng.) WILDFOWL CONSERVATION IN THE NETHERLANDS. Ninth Ann. Rep. Wildfowl Trust, p. 142-153, illus. 1958.

Interesting, illuminating account. "The Dutch are setting the rest of Europe an example by the vigorous way in which they are tackling the problems of wildfowl conservation within their borders. Widespread public interest and massive governmental support have been elicited. A good number of refuges have already been set aside and more are being designated every year. The extensive programmes of land reclamation and drainage are certainly bringing about a loss of wildfowl habitat, but new habitats are also coming into existence and are being incorporated into the refuge system. Shooting is on a smaller scale than in [Britain], netting has almost vanished and the especial problem of duck decoys [large traps] is well in hand. The Netherlands is but a small country, and for their efforts to bear the fruit they deserve it is essential that other countries which share the same migratory waterfowl should take like measures of conservation."

Meanley, Brooke, and Anna Gilkeson Meanley. (Patuxent Refuge, Laurel, Md.) NESTING HABITAT OF THE BLACK-BELLIED TREE DUCK IN TEXAS. Wilson Bul. 70(1): 94-95, 1 photo. Mar. 1958.

Medeiros, Joseph S. (Bd. Agr. & For., Hawaii.) PRESENT STATUS OF MIGRATORY WATERFOWL IN HAWAII. J. Wildl. Mgt. 22(2): 109-117, 2 maps. Apr. 1958.

A review of the history of waterfowl in Hawaii plus results of a trapping and banding study, 1949-55. Pintails and shovelers were the principal migrants. Total waterfowl numbers ranged from a low of 2,034 in 1950 to 10,462 in 1953. Pintail movements between islands were recorded. Of 2,811 ducks banded between 1949 and 1953, 107 were recovered on the N. Am. continent, and 18 returned and were retrapped in Hawaii. A pintail banded in Hawaii continued s. 2,100 miles and was found in the North Cook group of islands. There appears to be a "core" of pintails that returns to the Territory each year and probably leads the other ducks. Waterfowl hunting is not permitted: Hawaiian duck is too rare and would be endangered; one season could jeopardize the flight of other species.--Author.

Mendall, Howard L. (U. Maine, Orono.) THE RING-NECKED DUCK IN THE NORTHEAST. U. Maine Studies, 2d Ser., no. 73. U. Maine Bul. 60(16). xv + 317 p., 24 pl., 16 figs. June 1958. $2.50, paper, from U. Maine Library, Orono.

A splendid monographic study of Aythya collaris based on 21 years of work. Mendall seems to treat every aspect of the duck's field biology in detail--and his treatment is by no means limited to the NE. Chapter 1 is on description, identification, and peculiarities. Chapter 2 shows that the birds use a wide variety of habitats, but are fond of bog or bog-like areas, and are quick to use suitable new impoundments. Chapter 3 tells the remarkable story of the ring-neck's great recent increase in breeding range. It also outlines the overall breeding and winter ranges of the species. Chapter 4 analyzes migration routes. Chapter 5 takes up spring migration dates and spring sex ratios. Chapter 6 describes courtship, pairing, and territorialism. The ring-neck is not aggressively territorial; pairs even share areas. Nesting densities are unusually high. Chapter 7 is a lengthy treatment of nesting. First clutches av. 9 eggs, renestings av. 7 eggs. Nesting success is 70% for first clutches, 61% for renests. Predation is major cause of failures; flooding is second. More than half of nest losses result in renesting. The birds tend to return to their natal marshes, which favors management. Chapter 8, on the brood season, discusses hatching, care of young, development of young, and diminution of broods with age. Juvenile mortality is heaviest just after hatching and at about 3 weeks; main causes are exposure, accidents, and predation. Chapter 9, "The Post-breeding Season," takes up molt, molting areas, and dispersal of broods. Chapter 10 considers timing of fall migration and flock composition at that time. Chapter 11 is on the hunting season. The ring-neck is sporting and palatable--an important game bird in several parts of the U. S. Sex and age composition of kill is good in the NE. Crippling loss is high, about 30%. Chapter 12 discusses foods and feeding, with consideration of geographic and seasonal differences. The ring-neck is more versatile and adaptable in its feeding than are most diving ducks, but less so than dabblers. Chapter 13 considers census methods, population fluctuations, mortality factors, and sex ratios. Chapter 14, on management, approves present regulations, recommends control of water levels and creation of more interspersion in breeding marshes, points out need of undisturbed breeding areas, and questions advisability of predator control except on intensively managed areas. The back of the book has: 13-p. bibliography; a detailed appendix on plumages, weights, and measurements; a discussion of status and distribution in states and provinces of N. Am.; maps showing results of band recoveries; tables of data on such topics as "A comparison of nesting success by different study techniques," and "Breeding census, 1937-55"; and an index.

Ripley, Dillon. (Yale U., New Haven, Conn.) THE NENE CAN BE SAVED. Animal Kingdom 61(3): 82-89, 11 photos. May-June 1958.

The story of the near extermination of the Hawaiian goose and its present protection in the wild and propagation in captivity. Today there are more than 100 in captivity and at least 28 in the wild. A flock of more than 20 has been seen in the field.

Salter, Robert L. (Idaho Game Dept.) CANADA GOOSE NESTING STUDIES IN IDAHO. Idaho Wildl. Rev. 10(6): 7-9, 4 photos. May-June 1958.
Reports on goose production of several areas, 1952-57, and tells how and why the surveys are made. Total production of the areas has not changed greatly in the period. Flocks of some of the areas are essentially resident, others are migratory.

Schiller, Everett L. (Johns Hopkins Sch. Hygiene, Balt. 5, Md.) STUDIES ON THE HELMINTH FAUNA OF ALASKA XXXII. HYMENOLEPIS ECHINOROSTRAE N. SP., A CESTODE FROM THE LESSER SCAUP, AYTHYA AFFINIS (EYTON). J. Parasit. 43(2): 233-235, 4 figs. Apr. 1957.

Scott, Peter, and Hugh Boyd. (Wildfowl Trust, Slimbridge, Gloucestershire, Eng.) A POPULATION STUDY OF THE PINK-FOOTED GOOSE. [Also] CALCULATING METHODS USED IN THE STUDY. Proc. Linn. Soc. London 166: 15-16. 1956. [From J. Animal Ecol. 27(1).]
"A joint abstract of the two papers. The colony at Hofsjökull Ice-cap, Iceland, had about 8600 adults and 10,900 goslings in 1953. The British wintering population was of the order of 36,000-41,000 in the early autumn of 1952 and 1953. About 26% of adults die annually."

Scott, Peter, and Hugh Boyd, editors. THE NINTH ANNUAL REPORT OF THE WILDFOWL TRUST, 1956-1957. Publ. for Wildfowl Trust (Slimbridge, Gloucestershire, Eng.) by Country Life Ltd., 2-10 Tavistock St., Covent Garden, London, W.C.2, Eng. 240 p., illus. 1958. 10s.
This long, diversified report contains many short papers of interest to students of waterfowl. Papers take up: the Trust's new Peakirk Waterfowl Gardens; history of the Trust; living birds now in the Trust's collection; breeding success of these birds in 1957; use of the Trust's grounds by wild waterfowl; waterfowl banded in 1956-57; survival of Greenland White-fronted Geese in the wild; summary report on fluctuations of winter populations of Tufted Ducks in Britain; the beginning of aerial surveys of British waterfowl; status of Barnacle Geese in w. Scotland in Feb. 1957 as determined by aerial survey; discussion of new project for study of waterfowl food habits; scholarly consideration of the merits of rotationally flooded meadows as feeding areas for wintering waterfowl; Aspergillus fumigatus isolated from wild Pink-footed Geese; discussion of project for preparing a catalog of parasites of Anatidae; list of internal parasites found in 46 individual British waterfowl; tuberculosis in a Wigeon and a Shelduck; Peter Scott's account of a 103-day trip around the world, during which he naturalized at many places; long account of the anatids observed on this trip; brief report on Ne-ne in Hawaii; nesting of Pink-eared duck in Australia; waterfowl and their management in Pacific Flyway of N. Am.; an estimate of the number of wildfowl hunters in Britain and the amount they travel in pursuit of their sport; a good account of waterfowl conservation in the Netherlands; brief account of work with water birds at the Station Biologique de la Tour du Valant, in the Camargue of France; translation of a long paper on waterfowl research, management and hunting in Russia; effect of cold weather on distribution of Pink-footed geese in nw. Europe; proportion of first-year young among Brent Geese in Essex; account of the Greenland Expedition of 1956; skull pneumaticity of waterfowl in relation to mode of life; observations on S. Georgia Teal; and a note on sound made by flight of Ringed Teal.

Stewart, Paul A. (Ohio State U., Columbus 10.) LOCAL MOVEMENTS OF WOOD DUCKS (AIX SPONSA). Auk 75(2): 157-168. Apr. 1958.
Movements in Ohio were studied by color-marking, banding, and field observations, 1955-56. Broods usually remained on water near nests for 2 weeks and then moved to new areas. Such moves often resulted in groups of 5-6 broods. One brood moved 3.5 miles, if water course was followed. If lost from mother, young followed various moving objects and readily joined other broods of wood ducks. Females with broods made their usual morning and evening feeding flights to areas other than those occupied by the broods. Females began gathering into small groups when young were about 6 weeks old. Young concentrated in certain areas when they achieved flight. Six birds moved 5-8 miles. Birds at concentration centers did not shift, but formed nuclei of concentrations. Around Oct. 1, wood ducks left standing waters and went to rivers and creeks. These shifts were away from concentration areas; they usually were of less than 15 miles. Most southward migration occurred in late Oct. and early Nov. Shooting apparently hastened late fall movements.

Stewart, Robert E. (Patuxent Refuge, Laurel, Md.) DISTRIBUTION OF THE BLACK DUCK. US F&WS, Cir. 51. ii + 8 p., 3 maps. 1958. 15¢ from Supt. Documents.

Breeding and winter ranges are mapped and correlated with major vegetational zones. Regions of high and low population density are indicated. Winter inventory data for each state within the range are given for the years 1952-56, and certain interesting population fluctuations are pointed out. Winter populations totaled about 678,000 of which roughly 3/5 were in coastal areas from Mass. to N. C., with greatest densities in tidewater areas from N. J. to Va. Highest breeding densities were in hemlock-white pine-northern hardwood region e. of longitude 85°, and in tidewater areas of Del. Bay and e. shore of Chesapeake Bay in Md. It is interesting to note that the Chesapeake Bay region rates highly for both breeding and wintering.

Stewart, Robert E., and Joseph H. Manning. (Patuxent Refuge, Laurel, Md.) DISTRIBUTION AND ECOLOGY OF WHISTLING SWANS IN THE CHESAPEAKE BAY REGION. Auk 75(2): 203-211, 2 maps. Apr. 1958.

The Chesapeake region is the winter home of about half the continental population of these swans. In spring and fall it also has many transient swans. Survey data suggest that both Chesapeake and continental populations fluctuated widely in the years 1952-56, averaging about 41,000 and 85,700. The article discusses the ecological areas of the Chesapeake region with respect to their swan populations and the occurrence of important plants and mollusks. It then presents data on food habits as determined from contents of gullets and stomachs of 49 swans. Swans are largely restricted to shallow, marginal waters that are fresh, slightly brackish, or only moderately saline. Wild celery (Vallisneria) is the main food in fresh estuarine waters. The more important foods in brackish waters are widgeongrass (Ruppia), sago pondweed, and 2 species of thin-shelled mollusks: the long clam (Mya arenaria) and Macoma balthica.

Stowe, Leland. LONESOME LAKE. Mag. of Ducks & Geese 9(11): 12-13, 18-19, 30, 32-35, 37, 3 figs. Spring 1958.

This excerpt from the book "Crusoe of Lonesome Lake" (Random House, 1957) tells the true story of the trumpeter swans of Lonesome Lake, B. C., and of the Edwards family that has cared for them at the cost of much personal hardship for many years, with some help from the Can. Wildl. Serv. The article gives some information on biology and behavior of the swans.

Teplov, V. F., and N. N. Kartashev. WILDFOWL RESEARCH IN RUSSIA / BIOLOGICAL FOUNDATIONS FOR THE REGULATION OF WILDFOWLING IN THE CENTRAL DISTRICTS OF THE EUROPEAN PART OF THE U.S.S.R. Ninth Ann. Rep. Wildfowl Trust, p. 157-169. 1958. Transl. by D. D. Harber from Zool. Zh. 35(1): 77-88. 1956.

This paper is of special interest in the light it casts on present management of waterfowl in Russia. Spring and fall shooting is permitted. The spring season is from April 1 into the first week of May. The fall season is from Aug. 1 to Nov. 1 or 15. Spring shooting takes mainly drake mallards and is not considered bad. Its effect on the local population, however, could be lessened considerably if it began later, on April 20, and extended to May 10. These dates would also make it possible to bag more widgeon, white-fronted geese, and diving ducks. Any spring shooting at all should emphasize sport rather than numbers. Also, 25% of the waterfowl area should be closed to hunting. All spring shooters should be required to kill 2-3 pairs of hooded crows, which destroy many clutches of game birds. Furthermore, penalties for robbing duck nests should be increased. Fall shooting begins too early--too many broods are unable to fly and the mothers are too easily bagged. The fall season should not begin until Aug. 20 and should end Nov. 1, when masses of waterfowl have left. Breeding areas should be better protected before shooting season. As in spring, not less than 25% of waterfowl area should be closed to provide refuge area during shooting. Much more and better planned banding is necessary to provide data on hunting pressures, sources of birds, and related matters involved in making regulations. The paper has a number of tables concerning numbers and kinds of waterfowl present and shot at different seasons, seasonal changes in response of ♀ and ♂ mallards to decoy ducks, numbers of banded ducks recovered in spring, proportion of broods unable to fly by Aug. 1, and seasonal and regional distribution of recoveries of banded ducks in European part of U.S.S.R.

Thiessen, G. J., E. A. G. Shaw, R. D. Harris, J. B. Gollop, and H. R. Webster. (Thiessen & Shaw: Natl. Res. Council, Ottawa. Others: Can. Wildl. Serv., Ottawa.) ACOUSTIC IRRITATION THRESHOLD OF PEKING DUCKS AND OTHER DOMESTIC AND WILD FOWL. J. Acoustical Soc. Am. 29(12): 1301-1306, 6 graphs. Dec. 1957.

Experiments were made to test value of sounds in repelling ducks from field crops. Authors' abstract: "When exposed to sounds of sufficient intensity Peking ducks respond in a characteristic manner combining head shaking and tail twitching. The response rate (number of responses per unit-time) increases with intensity up to a certain level, but falls with further increase in intensity. There is no response at intensities lower than a certain critical value which may therefore be described as the irritation threshold. Prolonged exposure to sound leads to a more or less exponential drop in response rate but recovery is rapid during rest periods. Measurements on about thirty ducks indicate that the threshold has a broad minimum at about 500 cps and the average value at this frequency is about 70 db [all sound pressure levels are given with respect to 0.0002 d/cm^2] with a range of 65-85 db. There is some indication that the threshold is slightly lower for warble tones. At 15 and 18 kc no consistent responses have been obtained up to 115 and 120 db, respectively. Similar experiments with chickens and geese showed fewer responses and hence much less accurate results. It has also been shown that hungry Peking ducks are greatly discouraged from taking food placed in a low-frequency sound field at 100 db intensity." Conclusions: "On the whole the experiments in the field are quite discouraging. Some of the uncertainties regarding the origin of the birds responsible for repopulation might be eliminated by performing experiments on a larger scale. A siren mounted on an aircraft might cover 50 to 100 square miles so that diffusion of bird population over the boundaries of the treated area would not fill the area too rapidly. However, such experiments are costly and the results to date have not been sufficiently encouraging to justify them. On the basis of the experiments it was therefore concluded that with the equipment at present available the protection of crops from mallard and pintail ducks by the use of high-intensity sound is not an economical proposition."

Winner, Robert Wm. A STUDY OF LOCAL AND MIGRATORY MOVEMENTS OF BLACK AND MALLARD DUCK POPULATIONS IN CENTRAL OHIO. Ph.D. thesis, Ohio State U. 139 p. 1957. [From abstract in Dissertation Abstracts 18(3).]

"The behavior and ecology associated with upland feeding flights of these two species are discussed. This discussion includes such aspects as duration of upland feeding periods, behavior of the birds traveling to, from, and while on the feeding areas, cruising radius of field feeding ducks, and abundance and availability of food on the study area." First daily activity peak of both species, in field and laboratory, occurred at beginning of the photoperiod. In laboratory, second peak came in last hour of photoperiod. This was true of black ducks only if subjected to decrease in light intensity. It was true in mallards under either constant or decreasing light. In the wild, however, second peak of activity was more variable. Time of afternoon feeding varied with size of population and percentage of mallards: feeding was earlier when population was large and/or when it contained many mallards. Time of afternoon feeding did not appear to vary with other factors. From 180 individually marked ducks it was found that mean duration of stopover in fall was 5.3 days for blacks, 3.4 days for mallards. Departures could not be correlated with any combination of weather conditions.

CRANES, RAILS, SHOREBIRDS

Adams, David A., and Thomas L. Quay. (N. C. State Coll., Raleigh.) ECOLOGY OF THE CLAPPER RAIL IN SOUTHEASTERN NORTH CAROLINA. J. Wildl. Mgt. 22(2): 149-156. Apr. 1958.

Breeding biology, seasonal populations, and behavior of clapper rail (Rallus longirostris) were studied in the salt marshes at Southport, N. C., in 1955-56. The small wintering population was confined primarily to the mixed grass and grass-shrub communities at the more elevated fringes of the marsh. Twenty-three of the 30 nests found were in Spartina alterniflora of medium height (2-4 ft.). Mean number of eggs per clutch was 10.5 ± 0.29. Eleven of 26 nests were successful. Parental care lasted 5 or 6 weeks. Young started flying when 9 or 10 weeks old. A weekly index to age of immature rails was developed and is described. Fall migration occurred in Sept. and early Oct. Juvenile-adult ratios of summer (trapped) and fall (shot) populations were about 5:1.--T. L. Quay.

Braaksma, S., and M. F. Mörzer Bruijns. (Staatsbosbeheer Dienstvak Natuurbescherming, Utrecht.) PLEISTERPLAATSEN VAN KRAANVOGELS, GRUS GRUS L., IN NEDERLAND. Ardea 45(3/4): 143-167, 4 maps. 1957.

Dutch with English summary. Cranes that pause in Holland on migration prefer large heath and moor areas. There are now only 10-20 such areas used by cranes. These birds seldom use cultivated land. But heaths and moors are being transformed into agricultural fields. Three important ones have been lost to cranes in recent years and 2 others are scheduled for cultivation soon. It is necessary to set up adequate areas as crane reserves. Probably this is the only way to save, not only for Holland but for Western Europe, the thousands of cranes that pass through the country.

Kornowski, Gerhard. STUDY OF THE ETHOLOGY OF THE COOT, FULICA ATRA L. J. Ornith. 98(3): 318-355. 1957. [From Biol. Abs. 32(4).]

In German. The behavior during breeding from 1953 to 1955 was in various ponds. The only certain character for distinguishing the sexes is the voice. The birds arrive at their territory already paired. Copulation occurs on land; the male drives the female from the water. The boundary of the territory is not at the edge of the water but some 40 m. beyond. Pairs that stay all winter defend the territory in cold weather. Coots drive geese away but learn that mother geese are dangerous. The male builds the base for several nests and the female selects one for nesting. Both place feathers in the nest and flatten it by trampling. A "re-nest" may be built in 2 days. "Second-nests" are rare in Holstein. Incubation begins when the 4th to 7th egg is laid. In "re-nests" it begins on the 1st. Both partners incubate. The young hatch after 23-24 days. Part go to the water and the rest with the female. The adults often build a nest for resting the young. In 4-5 weeks the young begin to feed themselves and become independent at 8 weeks. The young/pair was: 1954, 28 broods averaged 2.9; 1955, 52 broods averaged 3.9. The independent young congregate into groups that swim and sleep together.--D. E. Davis.

OTHER BIRDS

Berger, D. D. (510 E. MacArthur Rd., Milwaukee 17, Wis.) ARTIFICIAL NESTS FOR THE GREAT HORNED OWL IN WISCONSIN. Die Vogelwarte 18(4): 183-185. 1956. [From abstract by H. C. Mueller, Bird-Banding 29(1).]

In German. "Great horned owls occupied 3 of the 5 nests built of sticks for them, and fledged 6 young. The appearance of this paper in a German journal emphasizes the interest of belatedly wise Europeans in restoring even predators in areas where they have been extirpated. In our country they are still shooting owls."

Brackbill, Hervey. (2620 Poplar Drive, Balt. 7, Md.) NESTING BEHAVIOR OF THE WOOD THRUSH. Wilson Bul. 70(1): 70-89. Mar. 1958.

Cottrille, W. Powell, and Betty D. Cottrille. (6075 Brown's Lake, Jackson, Mich.) GREAT BLUE HERON: BEHAVIOR AT THE NEST. U. Mich. Mus. Zool. Misc. Publ. no. 102. 1-15 p., 7 figs. Apr. 1958. 35¢.

Study of a colony in s. Mich. produced observations on sequence of activities through breeding season, general behavior, courtship, nest building, mating, behavior of young, and voice.

Cowles, R. B. (U. Calif., Los Angeles.) STARVING THE CONDORS? Calif. Fish & Game 44(2): 175-181. Apr. 1958.

It seems that everything possible has been done for the Calif. condor, but the species is not gaining. Are we overlooking a cheap and perhaps very effective method? Cowles points out that chaparral burns result in a vastly increased fauna and improved flow of streams and springs. They also improve landing and taking-off conditions for condors that land to feed. Accidental burns in and near condor country should be studied. Experiments are in order. The idea will horrify many people in s. Calif., for people associate chaparral burns with huge wildfires in old chaparral and consequent floods and mud flows. They see the blackened areas, but do not realize how enormously conditions improve for animals--often within a few months. Old chaparral is nearly a faunal desert in comparison with freshly revegetated chaparral. Relatively frequent control burns might even have long-term values in reducing erosion. Certainly they would cause a great increase of animal life, thereby producing much potential condor food.

Kluyver, H. N. (Inst. Ecol. Res., Arnhem, Holland.) ROOSTING HABITS, SEXUAL DOMINANCE AND SURVIVAL IN THE GREAT TIT. In Cold Spring Harbor Symposia on Quant. Biol. 22: 281-285, 1 fig. 1958.

Magnusson, Mauritz. THE EAGLE OWL BACK IN KILSBERGEN, PROVINCE OF NÄRIKE, SWEDEN. Sveriges Natur 3: 86-92. 1957. [From abstract by Louise deK. Lawrence, Bird-Banding 29(1).]
"The growing realization of the important role played by the raptors in the balance of nature induced the reintroduction of the Eagle Owl (Bubo b. bubo) into a suitable habitat...where in the past irresponsible hunters and game wardens had extirpated it. The lively account shows the careful planning and execution with which the experiment was carried out by the experts, assisted by many interested volunteers, to a conclusion deemed successful after the second nesting of the introduced birds. The male Eagle Owl chooses the hollow in which the hen then lays the eggs. The incubation period is 35 days."

Orr, Robert T. (Calif. Acad. Sci., San Francisco.) RED-TAILED HAWK FEEDS ON CRICKETS. Condor 60(2): 111. Mar.-Apr. 1958.
One individual contained 49 Stenopelmatus fuscus. Presumably these subterranean insects had been forced to surface by flooding.

Piechocki, Rudolf. STATISTICAL DATA ON 20,000 ENGLISH SPARROWS. J. Ornith. 95(3/4): 297-305. 1954. [From abstract by D. S. Farner, Bird-Banding 29(1).]
In German. "The sex ratio for a sample of 20,931 birds was 113.6 males per 100 females. The change in bill color of the males begins in December or January. The relationship between degree of testicular development and bill color is confirmed."

Quay, Thomas L. (N. C. State Coll., Raleigh, N. C.) THE FOODS AND FEEDING HABITS OF THE SAVANNAH SPARROW IN WINTER. J. Elisha Mitchell Sci. Soc. 74(1): 1-6. May 1958.
Good study of feeding habits and of stomach contents of 200 birds. Total food was 97% seeds and 3% arthropods. Digitaria seeds were 79% of all foods. Seeds of secondary importance were those of Ambrosia, Sorghum, and Eleusine. "Feeding was a continuous process, unhurried during most of the day but accelerated early in the morning and late in the afternoon. The crop was filled only once a day, at sunset." Data are given on capacity of crop and gizzard.

Schifferli, Alfred. AGE AND MORTALITY FOR THE TAWNY OWL (STRIX ALUCO) AND THE BARN OWL (TYTO ALBA) IN SWITZERLAND. Ornith. Beobachter 54: 50-56. 1957. [From long abstract by R. O. Bender, Bird-Banding 29(1).]
In German. Study of recoveries of young banded in nest. Bender's abstract presents the data. For tawny owl, mortality in first year was 47%, mortality in second year was 45%, and av. mortality after third year was 24%. For barn owl, comparable figures were 64%, 54%, and 39%. For tawny owl, life expectancy was 2.2 years after first year, 2.7 years after second year, and 3.7 years after 3rd year. For barn owl, comparable figures were 1.3, 1.7, and 2.1 years. Tawny owl had av. clutch of 3.2 and reared 2.1 young. Barn owl had av. clutch of 5.3 and reared 4.4. These data on reproduction agree well with demands that mortality rates make on each species for maintenance of populations.

Wendland, Victor. DESCRIPTION OF BREEDING BIOLOGY AND BEHAVIOR OF THE LONG-EARED OWL, ASIO OTUS. J. Ornith. 98(3): 241-261. 1957. [From Biol. Abs. 32 (4).]
In German. See informative abstract in Biol. Abs. 32(4).

REPTILES AND AMPHIBIANS

Allam, M. W., D. Weiner, and F. D. W. Lukens. (Sch. Vet. Med., U. Pa., Philadelphia.) COMPARISON OF CORTISONE AND ANTIVENIN IN THE TREATMENT OF CROTALINE ENVENOMATION. p. 393-397 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Ambrose, Michael S. (c/o Natl. Prov. Bank, 106 Kilburn High Rd., London NW 6, Eng.) SNAKEBITE IN CENTRAL AMERICA. p. 323-329 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Bellis, Edward David. AN ECOLOGICAL STUDY OF THE WOOD FROG, RANA SYLVATICA LE CONTE. Ph.D. thesis, U. Minn. 169 p. 1957. [From long abstract in Dissertation Abstracts 18(4).]

This population study was made in a spruce and tamarack bog in northern Minn. during summers of 1954-56. 1377 frogs were marked and released in a 14,400 sq. yd. area. ♂♂ and ♀♀ were approximately equal in number. Median distance between capture sites was 7.7 yards, av. minimum home range was 77 sq. yds. Many frogs were retaken in the same home area during 2 successive years. Frogs bred in April, metamorphosed in July. Summer half-life of the adult population was 35 days. Maximum individual age was at least 4 years. Growth slowed with increasing size and also proceeded more slowly during late Aug. and early Sept. than during warmer periods. ♀♀ bred at 3 years, ♂♂ at 2 years. Data are given also on sizes of ♂♂ and ♀♀; habitat preferences; population size differences in 1954 and 1955; effect of physical factors on activity, body color and color changes; predators; and foods.--L. F. Stickel.

Blair, W. Frank. (U. Texas, Austin.) CHANGES IN VERTEBRATE POPULATIONS UNDER CONDITIONS OF DROUGHT. In Cold Spring Harbor Symposia on Quant. Biol. 22: 273-275. 1958.

The local population of Sceloporus olivaceus and Acris crepitans survived severe drought and benefited from compensatory breeding mechanisms. Local populations of Rana catesbeiana and Anolis carolinensis died out.

Blair, W. Frank. (U. Texas, Austin.) MATING CALL IN THE SPECIATION OF ANURAN AMPHIBIANS. Am. Nat. 92(862): 26-51, 7 figs. Jan.-Feb. 1958.

Major research and review paper on effect of calls, as spectrographically analyzed, in preventing crosses between species. In some closely related species, calls are most distinct where ranges of the species overlap. Analysis of calls has been helpful with several taxonomic problems.

Bragg, Arthur N. (U. Okla., Norman.) DIMORPHISM AND CANNIBALISM IN TADPOLES OF SCAPHIOPUS BOMBIFRONS (AMPHIBIA, SALIENTIA). SW. Nat. 1(3): 105-108. 1956. [From Biol. Abs. 32(3).]

A tadpole of Scaphiopus bombifrons was seen to kill and eat eight others of its kind (in Tillman Co., Okla.). No others in several cultures were predaceously cannibalistic and predation could not be induced by feeding dead tadpoles to hungry individuals. Eight out of several hundreds preserved as collected at the same time and place had a buccal apparatus like that of the cannibal and were presumably cannibalistic in nature.--Author's abstract.

Brode, W. E., and Phillis Allison. (Gulf Coast Res. Lab., Ocean Springs, Miss.) BURROWING SNAKES OF THE PANHANDLE COUNTIES OF MISSISSIPPI. Herpetologica 14(1): 37-40. Apr. 1958.

Study of abundance, sizes, and foods of snakes found in pine stumps.

Cowles, R. B., and R. L. Phelan. (U. Calif., Los Angeles.) OLFACTION IN RATTLESNAKES. Copeia 1958(2): 77-83. June 1958.

Laboratory study with implications for snake control and physiology. Semi-starved rattlers of 4 species were exposed to various odors. Results were judged partly by observation of behavior, partly by rise of heart rate as determined by electrocardiograph with electrodes implanted under skin. Snakes did not respond to odors of fresh milk or fresh meat. They did respond to odors of decomposing milk or meat. Odor of extreme putrefaction was avoided. Snakes ignored fresh rodent meat but some ate decomposing rodent meat. In nature they may scavenge more than previously believed. Dead rodents were wrapped in paper and exposed in field. No snakes or mammals found them but vultures did. Did vultures use sense of smell? Three tested odors elicited fear reactions. These were odors of man, king snake, and skunk (thio-alcohol n-butyl mercaptan was used). The mercaptan is known to repel rodents from grain for 4 months. Adsorbed on charcoal it might prove a useful snake and rodent repellent. Soured milk with 5% or 10% nicotine sulfate was tested as a poison. One snake nearly

died after touching its tongue to the solution. Another did die. Experiments suggested that rattlers' sense of smell is sensitive and leads to further and more precise analysis by combination of tongue and Jacobson's organ. Experience during the work revealed that rattlers' sensitivity to mechanical vibration is more extreme than suspected.

Criley, B. R. (Wyeth Labs., Marietta, Pa.) DEVELOPMENT OF A MULTIVALENT ANTIVENIN FOR THE FAMILY CROTALIDAE. p. 373-380 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Dowling, Herndon G. (U. Ark., Fayetteville.) GEOGRAPHIC RELATIONS OF OZARKIAN AMPHIBIANS AND REPTILES. SW. Nat. 1(4): 174-189, 3 maps. Oct. 1956 [1958].

Ranges of amphibians and reptiles of the Interior Highland (Ozark Plateau and Ouachita Mountains) are contrasted, and an attempt is made to correlate present distributions with geologic and paleoclimatic history of region. Salamanders are better indicators of past distributional patterns than the other groups. Ecology of endemic species is described and interpreted in terms of adaptation for a semi-arid climate. Six herpetofaunal invasions of the Highland are suggested: a quite recent one from the east (Coastal Plain), a somewhat older one from the western plains, a late Pleistocene invasion from the north, and 3 or more older invasions from the Appalachian region. Predominance of eastern sources may be due to heavy reliance on salamanders (mostly derived from the humid east), and not a true picture for the herpetofauna as a whole.--Auth. abst.

Ferguson, Denzel Edward. THE GEOGRAPHIC VARIATION AND DISTRIBUTION OF THE LONG-TOED SALAMANDER, AMBYSTOMA MACRODACTYLUM BAIRD. Ph.D. thesis, Ore. State Coll. 94 p. 1957. [From long abstract in Dissertation Abstracts 18(2).]

Detailed study of taxonomy, variation, and distribution. Five subspecies, 2 new, are recognized. "Life history data pertaining to breeding, larval development and habitat are presented and compared between the four groups. Notes concerning food, enemies and size are included."

Goodman, John D. (U. Redlands, Redlands, Calif.) MATERIAL INGESTED BY THE COTTONMOUTH, AGKISTRODON PISCIVORUS, AT REELFOOT LAKE, TENNESSEE. Copeia 1958 (2): 149. June 1958.

Reports food and nonfood items from stomachs of 4 individuals and comments on nonfood items that have been reported from stomachs of other reptiles.

Hadidian, Z. (Tufts Coll. Med. Sch., Boston, Mass.) PROTEOLYTIC ACTIVITY AND PHYSIOLOGIC AND PHARMACOLOGIC ACTIONS OF AGKISTRODON PISCIVORUS VENOM. p. 205-215, 3 figs., in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Hamilton, W. J., Jr., and Joseph A. Pollack. (Cornell U., Ithaca, N. Y.) NOTES ON THE LIFE HISTORY OF THE RED-TAILED SKINK. Herpetologica 14(1): 25-28, 1 photo. Apr. 1958.

Eumeces egregius: fall and winter activity, food, reproduction, predators.

Hendricks, L. J., and James Kezer. (San Jose State Coll., San Jose, Calif.) AN UNUSUAL POPULATION OF A BLIND CAVE SALAMANDER AND ITS FLUCTUATION DURING ONE YEAR. Herpetologica 14(1): 41-43. Apr. 1958.

Abundance and ecology of Typhlotriton spelaeus in cave in Mo.

Hunt, Timothy J. (Zool. Soc. London, Regent's Park, London NW. 1, Eng.) INFLUENCE OF ENVIRONMENT ON NECROSIS OF TURTLE SHELLS. Herpetologica 14(1): 45-46, 1 fig. Apr. 1958.

Alternate growth and drying of algae on Emys orbicularis caused necrosis and sloughing of dorsal scutes, and, if not arrested, eventual death.

Hutchison, Victor H. (Duke U., Durham, N. C.) THE DISTRIBUTION AND ECOLOGY OF THE CAVE SALAMANDER, EURYCEA LUCIFUGA. Ecol. Monog. 28(1): 1-20, 13 figs. Jan. 1958.

"This study...consisted of three parts: (1) distribution and habitat selection, (2) field studies on population structure, population dynamics, environmental factors, food, habitats, and competition, (3) experimental laboratory work on activity, critical thermal maxima, reactions to light, and vital limits of water loss of E. lucifuga and E. longicauda longicauda."

Jensen, H., and U. Westphal. (Med. Res. Lab., Ft. Knox, Ky.) CHEMICAL STRUCTURE AND INTERRELATIONSHIP OF TOAD POISONS. p. 75-83, 9 figs., in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Keegan, Hugh L. (Walter Reed Army Med. Center, Wash., D. C.) ANTIVENINS AVAILABLE FOR TREATMENT OF ENVENOMATION BY POISONOUS SNAKES, SCORPIONS, AND SPIDERS. p. 413-438 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Klimstra, W. D. (S. Ill. U., Carbondale.) SOME OBSERVATIONS ON SNAKE ACTIVITIES AND POPULATIONS. Ecology 39(2): 232-239, 4 graphs. Apr. 1958.

Summary: "Observations of seasonal activities and numbers of snakes were conducted in Iowa, 1946-1948, and limited studies were continued in Illinois, 1950-1955. Iowa data for five species of snakes indicated two peaks, May and October, in seasonal abundance for each species. Possible factors responsible for seasonal increase and decrease in snake activity are discussed. Climatic conditions, especially temperature, seemed to be correlated closely with activity. Greatest activity was associated with mean temperatures of 58°F, and least activity with around mean temperatures of 40° and 78°. Data are presented which suggest that snake populations fluctuate."

Lefrou, G., and V. Michard. (Inst. Pasteur, Kindia, French Guinea.) CONTRIBUTION TO THE STUDY OF ANTIHISTAMINES IN THE TREATMENT OF SNAKE-BITE POISONING. Bul. Soc. Pathol. Exot. 49(5): 936-945. 1956. [From Biol. Abs. 32(6).]

In French. Neoantergan had no effect on the severity of the reaction of guinea pigs and baboons to Bitis gabonica venom, but it caused rabbits to die more quickly. It accelerated the fatal action of Dendraspis viridis venom on guinea pigs, baboons and rabbits.--N. D. Levine.

Legler, John M. (Mus. Nat. Hist., U. Kans., Lawrence.) EXTRA-UTERINE MIGRATION OF OVA IN TURTLES. Herpetologica 14(1): 49-52, 1 graph. Apr. 1958.

An interesting point is that "counts of corpora lutea are, in the great majority of cases, an exact indication not only of the number of eggs produced by the ovary, but also of number of eggs laid."

McMullen, Bettine Scott. A PRELIMINARY SURVEY OF THE AMPHIBIANS AND REPTILES OF KLEBERG CO., TEXAS. M. S. thesis, Texas Coll. Arts & Ind. (Kingsville). 81 p. 1958.

39 taxa of herptiles were collected in Kleberg Co. Data are presented on their distribution, ecology, and measurements. Identification keys are included. Hypothetical list is provided.--J. T. Peacock.

Milstead, Wm. W. (Sul Ross State Coll., Alpine, Texas.) OBSERVATIONS ON THE NATURAL HISTORY OF FOUR SPECIES OF WHIPTAIL LIZARD, CNEMIDOPHORUS (SAURIA, TEIIDAE) IN TRANS-PECOS TEXAS. SW. Nat. 2(2/3): 105-121. 1957. [From Biol. Abs. 32(5).]

During the summers of 1951 and 1952, observations were made of the activities of C. perplexus, sacki, tessellatus, and tigris at 3 stations in Brewster and Presidio counties. The activities reported upon include foraging habits, responses to heat, home range, and breeding activities.--Auth. abst.

Minton, Sherman A., Jr. (Ind. U. Med. Center, Indianapolis.) SOME PROPERTIES OF NORTH AMERICAN PIT VIPER VENOMS AND THEIR CORRELATION WITH PHYLOGENY. p. 145-151, 1 graph, in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Mullally, Don P. (U. Calif., Los Angeles.) DAILY PERIOD OF ACTIVITY OF THE WESTERN TOAD. Herpetologica 14(1): 29-31. Apr. 1958.
Bufo boreas may be active by day or by night, depending on altitude.

Norris, Kenneth Stafford. (Marineland of Pacific, Marineland, Calif.) THE EVOLUTION AND SYSTEMATICS OF THE IGUANID GENUS UMA AND ITS RELATION TO THE EVOLUTION OF OTHER NORTH AMERICAN DESERT REPTILES. Bul. Am. Mus. Nat. Hist. 114(3): 247-326, 17 figs., 4 pl. Mar. 1958. $1.50, paper.
A paper that all students of Am. desert animals should have at hand because of the large amount of information it brings together on the desert-sand habitat, and on the geological, climatic, and vegetational history of our deserts. As a single convenient reference (and source of references) on these topics, it must be unequalled. Norris brings this information to bear in presenting all that is known of the ecology of Uma, including analysis of coloration in relation to concealment and heat control. His treatment of taxonomy and variation is thoroughly handled. Evolution of the forms is discussed in relation to history of the deserts. Few other papers have so well represented the integration of taxonomy, ecology, and paleogeography.

Oliver, James A. (N. Y. Zool. Soc., N. Y. 60.) THE NOT-SO-FRIGHTFUL COPPERHEAD. Animal Kingdom 61(2): 40-46, 10 figs. Apr. 1958.
Good popular account of distribution (map), races (photos), habits, seasonal activities, foods, young, danger to man, and confusion with harmless snakes. Cooperheads do persist in settled areas, but fear of them is much greater than justified. The snake is retiring rather than aggressive. Its bite is rarely fatal to a person weighing more than 50 lbs. Furthermore, most snakes feared as copperheads are really harmless species that are easily distinguished.

Oliver, James A. (N. Y. Zool. Soc., N. Y. 60.) SNAKES IN FACT AND FICTION. Macmillan, 60 5th Ave., N. Y. 11, N. Y. xv + 199 p., photos. 1958. $4.95.
Readable and entertaining enough for anyone, yet authoritative enough to have reference value, this book tells what the average person most wants to know about snakes. What is the biggest snake? Can any snake eat a human being? What is the most dangerous snake? How do snake charmers achieve the seemingly impossible? Why are there no snakes in Ireland? Why shouldn't we introduce mongooses to control snakes? To these and many other questions Dr. Oliver applies much information that is unfamiliar even to most herpetologists and enlivens it with anecdotes. Chapters deal with mythical monsters and sea snakes, giant snakes, prodigious meals, aggressiveness, the deadliest snakes of the world, snake charmers, family life, numbers and aggregations, serpentine stowaways, mongooses and other snake-eaters, and personal experiences. Weighing much evidence in an interesting fashion, Oliver concludes that the anaconda reaches a length of at least 37 feet and is the longest and heaviest snake living. Several species can be claimed as the most dangerous, but after considering the facts Oliver believes that the king cobra has the best claim. Some big snakes can eat people, but rarely have been known to do so. Aggressiveness and speed of certain snakes such as mambas and king cobras and bushmasters has been vastly exaggerated; all species prove to be habitually retiring, but some are aggressive under certain conditions. Mambas hold the speed record for snakes--1 was timed at 7 m.p.h. No snake can outrun a man. Snake charmers and snake handlers are clever operators who work with safely fixed snakes, or else choose cooperative, predictable individual snakes and take their chances. Mongooses are shown to be poor snake killers but great pests. These selected facts give only a slight indication of the amount of sound biology and interesting incidental information that the book contains.

Parrish, Henry M. (Yale Univ., New Haven, Conn.) EARLY EXCISION AND SUCTION OF SNAKEBITE WOUNDS IN DOGS. p. 399-404 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Parrish, Henry M. (Yale Univ., New Haven, Conn.) ON THE INCIDENCE OF POISONOUS SNAKEBITES IN FLORIDA: ANALYSIS OF 241 CASES OCCURRING DURING 1954 AND 1955. Am. J. Trop. Med. & Hygiene 6(4): 761-765. July 1957.
Based on questionnaire. Doctors and hospitals reported an av. of 120 bites per year, with av. fatality rate of 2.5%, or 3 deaths per year. Bites were most frequent in spring and summer. Rattlesnakes were responsible for about half the bites. More than 90% of bites were on extremities. Nearly half of bites were in people less than 20 years old. "It was estimated that 41 per cent of these patients had minimal venenation, 39 per cent had moderate venenation, and 20 per cent had severe venenation. Apparently the patients with severe venenation did not receive the recommended amount of antivenin."

Parrish, Henry M., and Robert E. Thompson. (Sch. Med., Yale U., New Haven, Conn.) HUMAN ENVENOMATION FROM BITES OF RECENTLY MILKED RATTLESNAKES: A REPORT OF THREE CASES. Copeia 1958(2): 83-86. June 1958.
Recently milked snakes can deliver dangerous bites.

Peabody, Frank E. (U. Calif., Los Angeles.) A KANSAS DROUTH RECORDED IN GROWTH ZONES OF A BULLSNAKE. Copeia 1958(2): 91-94, 1 pl. June 1958.
"It is concluded that the growth zones in the squamosal and ectopterygoid of the bullsnake are excellent indicators of age, and in this instance, also record faithfully a time of crisis in the life of the bullsnake occasioned probably by the severe drouth in Kansas in the summers of 1924, 1925 and 1926." "Clearly the annular zones seen in section do not lend themselves to discrete recordings of interrupted summer growth as do the growth zones appearing on the surface of the skull bones... There seems to be no way to detect on such a small scale as the cross section of maxillary and dentary the growth record literally stretched out on flat bones of the skull."

Reed, Clyde F. (10105 Harford Rd., Balt. 34, Md.) CONTRIBUTIONS TO THE HERPETOLOGY OF MARYLAND AND DELMARVA, NO. 17: SOUTHEASTERN HERPTILES WITH NORTHERN LIMITS ON COASTAL MARYLAND, DELMARVA AND NEW JERSEY. J. Wash. Acad. Sci. 48(1): 28-32, 16 maps. Jan. 1958.

Reed, Clyde F. (10105 Harford Rd., Balt. 34, Md.) CONTRIBUTIONS TO THE HERPETOLOGY OF MARYLAND AND DELMARVA, 13: .PIEDMONT HERPETOFAUNA ON COASTAL DELMARVA. J. Wash. Acad. Sci. 48(3): 95-99, 17 maps. Mar. 1958.

Schöttler, W. H. A. (Inst. Butantan, São Paulo, Brazil.) MISCELLANEOUS OBSERVATIONS ON SNAKE VENOMS AND ANTIVENINS. Mem. Inst. Butantan 27: 73-105, illus. 1955-1956 [recd. 1958]. [From Biol. Abs. 32(6).]
In Portuguese and English. This paper presents a collection of supplementary observations and experiments made in connection with an extensive study on Bothrops venoms and their antivenins published elsewhere (Bul. World Health Org. 5: 293-. 1952).--From auth. summ.

Schwartz, Albert. (Albright Coll., Reading, Pa.) CHORUS FROGS (PSEUDACRIS NIGRITA LeCONTE) IN SOUTH CAROLINA. Am. Mus. Novitates no. 1838. 1-12 p., 1 map. Aug. 1957.
Evidence that P. nigrita and feriarum behave as species rather than subspecies in the Southeast, with overlapping ranges and no intergradation. "On the basis of these facts, the subspecies currently referred to P. nigrita should be rearranged as follows:" P. nigrita nigrita, P. nigrita verrucosa, P. triseriata triseriata, P. triseriata maculata, P. triseriata feriarum, P. triseriata kalmi.

Sexton, Owen James. THE SPATIAL AND SEASONAL DISTRIBUTION OF A POPULATION OF THE PAINTED TURTLE, CHRYSEMYS PICTA MARGINATA AGASSIZ. Ph.D. thesis, U. Mich. 253 p. 1957. [From abstract in Dissertation Abstracts 18(5).]
A population of about 800 turtles was studied in and near Crane Pond on the George Reserve, Mich. A method was developed for aging turtles up to 12-15 years from measurements of shell annuli. There were 1.66 ♀♀ per ♂; juveniles and adults were approximately equal in number. Reproductive success was about 7%. Turtles emerged from hibernation March 15-25, but were not active then. Raccoon predation was heavy. Turtles left the pond as it warmed over 8°C.

(Mar. 26-May 31); feeding, mating, nesting and emergence of last year's hatchlings began. During summer (June 1-Aug. 31) they moved back into the pond to feed on floating vegetation; active growth and shedding proceeded. In fall (Sept. 1-Nov. 30) feeding and growth ceased and turtles moved into deeper parts of the pond.--L. F. Stickel.

Stebbins, Robert C. (MVZ, U. Calif., Berkeley.) A NEW ALLIGATOR LIZARD FROM THE PANAMINT MOUNTAINS, INYO COUNTY, CALIFORNIA. Am. Mus. Novitates no. 1883. 1-27 p., 6 figs. Mar. 1958.

Description of the new species, Gerrhonotus panamintinus, and its habitat is followed by an important section in which characters and relationships of genera related to Gerrhonotus are reviewed. Only 3 genera are recognized: Gerrhonotus, Abronia, and Coloptychon. The name Elgaria is synonymized under Gerrhonotus and Barisia is made a subgenus of Gerrhonotus. Ranges of all species of both subgenera of Gerrhonotus are mapped.

Stebbins, Robert C., and Richard M. Eakin. (MVZ, U. Calif., Berkeley.) THE ROLE OF THE "THIRD EYE" IN REPTILIAN BEHAVIOR. Am. Mus. Novitates no. 1870. 1-40 p., 14 figs. Feb. 1958.

Parietal eyes of 4 species of lizards were removed or covered. Treated individuals increased their amount of exposure to strong light. Treated and control lizards did not differ in body temperatures, but treated ones spent more time at the thermal level of normal activity. Parietalectomy was accompanied by more locomotory activity. Operated lizards av. 3 times greater displacement from home ranges than controls. Also, they were less inclined to retreat from people. Thyroid glands of treated lizards tended to hypertrophy and lose colloid. Operated lizards were less viable than controls when deprived of food, probably because increased metabolism resulted in faster exhaustion of energy reserves. Sections revealed no nerve connection between parietal eye and brain. The parietal retina appears to be secretory; its activity probably varies with intensity of solar radiation received. "It may be concluded that the parietal eye in the diurnal lizards studied functions in helping to regulate the amount of exposure to sunlight." The paper also reviews findings and theories on functions of pineal and parietal eyes of many sorts of animals.

Swaroop, S., and B. Grab. (Stat. Studies Sec., World Health Org., Geneva, Switz.) THE SNAKEBITE MORTALITY PROBLEM IN THE WORLD. p. 439-446 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Tinkham, Ernest R. (Indio, Calif.) THE DEADLY NATURE OF GILA MONSTER VENOM. p. 59-63 in VENOMS, ed. by E. E. Buckley & Nandor Porges, Am. Assn. Adv. Sci., Wash. 5, D. C. 1956.

Tinkle, Donald W. (Texas Tech. Coll., Lubbock.) THE SYSTEMATICS AND ECOLOGY OF THE STERNOTHAERUS CARINATUS COMPLEX (TESTUDINATA, CHELYDRIDAE). Tulane Studies Zool. 6(1): 1-56 p., 57 figs. Mar. 1958. $1.25.

The first part of this paper is a detailed study of ontogenetic and geographic variation and systematics of S. carinatus, S. m. minor, S. m. peltifer, and S. depressus. It includes key to all forms of the genus and discussion of relationships. It also presents a comparison of distributional patterns and rates of speciation in Sternothaerus and other groups of aquatic turtles of the SE. The second part takes up growth, size and age at sexual maturity, sex ratios, reproduction, foods, general habits, habitats, and reactions to light, heat, and current.

Trapp, Myra May. (U. Ark., Fayetteville.) RANGE AND NATURAL HISTORY OF THE RINGED SALAMANDER, AMBYSTOMA ANNULATUM COPE (AMBYSTOMIDAE). SW. Nat. 1(2): 78-82, illus. 1956. [From Biol. Abs. 32(3).]

FISHES

Eddy, Samuel. (U. Minn.) HOW TO KNOW THE FRESHWATER FISHES / PICTURED-KEYS FOR IDENTIFYING ALL OF THE FRESHWATER FISHES OF THE UNITED STATES AND ALSO INCLUDING A NUMBER OF MARINE SPECIES WHICH OFTEN ENTER FRESHWATER. Wm. C. Brown Co., Dubuque, Iowa. vi + 253 p., 615 figs. 1957. $2.75, spiralbound; $3.25, cloth.

These keys have been tested by many of Eddy's ichthyology classes. They have been made as simple as possible but seem technical enough to work. Drawings show hundreds of species and structures. Technicalities are also explained in introduction and glossary. There is an interesting general discussion of each family. Each species is briefly described and its range is stated. A few less well characterized species are not keyed out but are discussed at the proper places. J. B. Kimsey says of this book (Calif. Fish & Game, Apr. 1958): "A series of indigenous California species was keyed out by this reviewer with ease. Several genera (e.g., Siphateles) are not carried out to species. This is understandable, since the position of numerous subspecies is not clear. The myriad members of the genus Notropis all appear to have been included. The only California representative, Notropis lutrensis, keyed out quite easily. Nearly all of the California indigenous minnows seem to have been illustrated from preserved, frequently immature, specimens or from illustrations. The result is that few of them accurately represent the species they mean to illustrate. A number of errors in ranges were also noted (e.g., threadfin shad, page 43). The common name of Chasmistes cujus is given as Couis, rather than Cui-ui. Nearly all the omissions noted by this reviewer may be attributed to a first edition or to the eastern affiliations of the author. We have waited for a long time for a key to the freshwater fishes of North America. Despite the remarks... above, the book is well worth the moderate asking price."

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